

THEORY – 1

ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY

5TH SEMESTER, MECHANICAL ENGINEERING

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Chapter – 6

LEADERSHIP AND MOTIVATION

TOPIC TO BE COVERED :-

► LEADERSHIP

- **Definition and Need/Importance**
- **Qualities and functions of a leader**
- **Manager Vs Leader**
- **Style of Leadership (Autocratic, Democratic, Participative)**

► MOTIVATION

- **Definition and characteristics**
- **Importance of motivation**
- **Factors affecting motivation**
- **Theories of motivation (Maslow)**
- **Methods of Improving Motivation**
- **Importance of Communication in Business**
- **Types and Barriers of Communication**

UNIT-6

LEADERSHIP AND MOTIVATION

a) Leadership

- Definition and Need/Importance
- Qualities and functions of a leader
- Manager Vs Leader
- Style of Leadership (Autocratic, Democratic, Participative)

b) Motivation

- Definition and characteristics
- Importance of motivation
- Factors affecting motivation
- Theories of motivation (Maslow)
- Methods of Improving Motivation
- Importance of Communication in Business
- Types and Barriers of Communication

Leadership is the potential to influence behaviour of others. It is also defined as the capacity to influence a group towards the realization of a goal. Leaders are required to develop future visions, and to motivate the organizational members to want to achieve the visions.

George R. Terry, "Leadership is a relationship in which one person influences others to work together willingly on related tasks to attain what the leader desires." Koontz and O'Donnell, "Leadership is the process of influencing people so that they will strive willingly towards the achievement of group goals."

According to Keith Davis, "Leadership is the ability to persuade others to seek defined objectives enthusiastically. It is the human factor which binds a group together and motivates it towards goals."

Characteristics of Leadership

1. It is an inter-personal process in which a manager is into influencing and guiding workers towards attainment of goals.
2. It denotes a few qualities to be present in a person which includes intelligence, maturity and personality.
3. It is a group process. It involves two or more people interacting with each other.
4. A leader is involved in shaping and moulding the behaviour of the group towards accomplishment of organizational goals.
5. Leadership is situation bound. There is no best style of leadership. It all depends upon tackling with the situations.

Nature of leadership

- Leadership derives from the power and is similar to, yet distinct from, management. In fact, "leadership" and "management" are different. There can be leaders of completely unorganized groups, but there can be managers only of organized groups. Thus it can be said that a manager is necessarily a leader but a leader may not be a manager.
- Leadership is essential for managing. The ability to lead effectively is one of the keys to being an effective manager because she/he has to combine resources and lead a group to achieve objectives.
- Leadership and motivation are closely interconnected. By understanding motivation, one can appreciate better what people want and why they act as they do. A leader can encourage or dampen workers' motivation by creating a favourable or unfavourable working environment in the organization.
- The essence of leadership is followership. In other words, it is the willingness of people to follow a person that makes that person a leader. Moreover, people tend to follow those whom they see as providing a means of achieving their desires, needs and wants.
- Leadership involves an unequal distribution of power between leaders and group members. Group members are not powerless; they can shape group activities in some ways. Still, the leader will usually have more power than the group members.
- Leaders can influence the followers' behaviour in some ways. Leaders can influence workers either to do ill or well for the company. The leader must be able to empower and motivate the followers to the cause.
- The leader must co-exist with the subordinates or followers and must have a clear idea about their demands and ambitions. This creates loyalty and trust in subordinates for their leader.
- Leadership is to be concerned about values. Followers learn ethics and values from their leaders. Leaders are the real teachers of ethics, and they can reinforce ideas. Leaders need to make positive statements of ethics if they are not hypocritical.
- Leading is a very demanding job both physically and psychologically. The leader must have the strength, power, and ability to meet the bodily requirements; zeal, energy, and patience to meet the mental requirements for leading.

The following points justify the importance of leadership in a concern.

1. **Initiates action-** Leader is a person who starts the work by communicating the policies and plans to the subordinates from where the work actually starts.
2. **Motivation-** A leader proves to be playing an incentive role in the concern's working. He motivates the employees with economic and non-economic rewards and thereby gets the work from the subordinates.
3. **Providing guidance-** A leader has to not only supervise but also play a guiding role for the subordinates. Guidance here means instructing the subordinates the way they have to perform their work effectively and efficiently.



4. **Creating confidence-** Confidence is an important factor which can be achieved through expressing the work efforts to the subordinates, explaining them clearly their role and giving them guidelines to achieve the goals effectively. It is also important to hear the employees with regards to their complaints and problems.
5. **Building morale-** Morale denotes willing co-operation of the employees towards their work and getting them into confidence and winning their trust. A leader can be a morale booster by achieving full co-operation so that they perform with best of their abilities as they work to achieve goals.
6. **Builds work environment-** Management is getting things done from people. An efficient work environment helps in sound and stable growth. Therefore, human relations should be kept into mind by a leader. He should have personal contacts with employees and should listen to their problems and solve them. He should treat employees on humanitarian terms.
7. **Co-ordination-** Co-ordination can be achieved through reconciling personal interests with organizational goals. This synchronization can be achieved through proper and effective co-ordination which should be primary motive of a leader.

Leader versus Manager

“Leadership and managership are two synonymous terms” is an incorrect statement. Leadership doesn't require any managerial position to act as a leader. On the other hand, a manager can be a true manager only if he has got the traits of leader in him. **By virtue of his/her position, manager has to provide leadership to his group.**

A manager has to perform all five functions to achieve goals, i.e., Planning, Organizing, Staffing, Directing, and Controlling. Leadership is a part of these functions.

Leadership as a general term is not related to managership. A person can be a leader by virtue of qualities in him. For example: leader of a club, class, welfare association, social organization, etc. Therefore, it is true to say that, “All managers are leaders, but all leaders are not managers.”

A leader is one who influences the behaviour and work of others in group efforts towards achievement of specified goals in a given situation. On the other hand, manager can be a true manager only if he has

got traits of leader in him. Manager at all levels are expected to be the leaders of work groups so that subordinates willingly carry instructions and accept their guidance. A person can be a leader by virtue of all qualities in him.

Leaders and Managers can be compared on the following basis:

Basis	Manager	Leader
Origin	A person becomes a manager by virtue of his position.	A person becomes a leader on basis of his personal qualities.
Formal Rights	Manager has got formal rights in an organization because of his status.	Rights are not available to a leader.
Followers	The subordinates are the followers of managers.	The group of employees whom the leaders leads are his followers.
Functions	A manager performs all five functions of management.	Leader influences people to work willingly for group objectives.
Necessity	A manager is very essential to a concern.	A leader is required to create cordial relation between person working in and for organization.
Stability	It is more stable.	Leadership is temporary.
Mutual Relationship	All managers are leaders.	All leaders are not managers.
Accountability	Manager is accountable for self and subordinates behaviour and performance.	Leaders have no well defined accountability.
Concern	A manager's concern is organizational goals.	A leader's concern is group goals and member's satisfaction.
Followers	People follow manager by virtue of job description.	People follow them on voluntary basis.
Role continuation	A manager can continue in office till he performs his duties satisfactorily in congruence with	A leader can maintain his position only through day to

	organizational goals.	day wishes of followers.
Sanctions	Manager has command over allocation and distribution of sanctions.	A leader has command over different sanctions and related task records. These sanctions are essentially of informal nature.

Qualities of a Leader

1. **Physical appearance-** A leader must have a pleasing appearance. Physique and health are very important for a good leader.
2. **Vision and foresight-** A leader cannot maintain influence unless he exhibits that he is forward looking. He has to visualize situations and thereby has to frame logical programmes.
3. **Intelligence-** A leader should be intelligent enough to examine problems and difficult situations. He should be analytical who weighs pros and cons and then summarizes the situation. Therefore, a positive bent of mind and mature outlook is very important.
4. **Communicative skills-** A leader must be able to communicate the policies and procedures clearly, precisely and effectively. This can be helpful in persuasion and stimulation.
5. **Objective-** A leader has to be having a fair outlook which is free from bias and which does not reflect his willingness towards a particular individual. He should develop his own opinion and should base his judgement on facts and logic.
6. **Knowledge of work-** A leader should be very precisely knowing the nature of work of his subordinates because it is then he can win the trust and confidence of his subordinates.
7. **Sense of responsibility-** Responsibility and accountability towards an individual's work is very important to bring a sense of influence. A leader must have a sense of responsibility towards organizational goals because only then he can get maximum of capabilities exploited in a real sense. For this, he has to motivate himself and arouse and urge to give best of his abilities. Only then he can motivate the subordinates to the best.
8. **Self-confidence and will-power-** Confidence in himself is important to earn the confidence of the subordinates. He should be trustworthy and should handle the situations with full will power.

Role of a Leader

1. **Required at all levels-** Leadership is a function which is important at all levels of management. In the top level, it is important for getting co-operation in formulation of plans and policies. In the middle and lower level, it is required for interpretation and execution of plans and programmes framed by the top management. Leadership can be exercised through guidance and counselling of the subordinates at the time of execution of plans.
2. **Representative of the organization-** A leader, i.e., a manager is said to be the representative of the enterprise. He has to represent the concern at seminars, conferences, general meetings, etc. His role is to communicate the rationale of the enterprise to outside public. He is also representative of the own department which he leads.
3. **Integrates and reconciles the personal goals with organizational goals-** A leader through leadership traits helps in reconciling/ integrating the personal goals of the employees with the organizational goals. He is trying to co-ordinate the efforts of people towards a common purpose and thereby achieves objectives. This can be done only if he can influence and get willing co-operation and urge to accomplish the objectives.
4. **He solicits support-** A leader is a manager and besides that he is a person who entertains and invites support and co-operation of subordinates. This he can do by his personality, intelligence, maturity and experience which can provide him positive result. In this regard, a leader has to invite

suggestions and if possible implement them into plans and programmes of enterprise. This way, he can solicit full support of employees which results in willingness to work and thereby effectiveness in running of a concern.

5. **As a friend, philosopher and guide-** A leader must possess the three dimensional traits in him. He can be a friend by sharing the feelings, opinions and desires with the employees. He can be a philosopher by utilizing his intelligence and experience and thereby guiding the employees as and when time requires. He can be a guide by supervising and communicating the employees the plans and policies of top management and secure their co-operation to achieve the goals of a concern. At times he can also play the role of a counsellor by counselling and a problem-solving approach. He can listen to the problems of the employees and try to solve them.

Leadership and Motivation

Motivation is a goal-oriented characteristic that helps a person achieve his objectives. It pushes an individual to work hard at achieving his or her goals. An executive must have the right leadership traits to influence motivation. However, there is no specific blueprint for motivation.

As a leader, one should keep an open perspective on human nature. Knowing different needs of subordinates will certainly make the decision-making process easier.

Both an employee as well as manager must possess leadership and motivational traits.

An effective leader must have a thorough knowledge of motivational factors for others. He must understand the basic needs of employees, peers and his superiors. Leadership is used as a means of motivating others.

Given below are important guidelines that outline the basic view of motivation:

- **Harmonize and match the subordinate needs with the organizational needs.** As a leader, the executive must ensure that the business has the same morals and ethics that he seeks in his employees. He should make sure that his subordinates are encouraged and trained in a manner that meets the needs of the business.
- **Appreciation and rewards** are key motivators that influence a person to achieve a desired goal. Rewarding good/ exceptional behavior with a small token of appreciation, certificate or letter can be a great motivator. If a certificate is awarded to a person, it should mention the particular act or the quality for which the individual is being rewarded.
- **Being a role model** is also a key motivator that influences people in reaching their goals. A leader should set a good example to ensure his people to grow and achieve their goals effectively.
- **Encouraging individuals** to get involved in planning and important issues resolution procedure not only motivates them, but also teaches the intricacies of these key decision-making factors. Moreover, it will help everyone to get better understanding of their role in the organization. The communication will be unambiguous and will certainly attract acknowledgement and appreciation from the leader.
- **Developing moral and team spirit** certainly has a key impact on the well-being of an organization. The mental or emotional state of a person constitutes his or her moral fabric. A leader's actions and decisions affect the morale of his subordinates. Hence, he should always be aware of his decisions and activities. Team spirit is the soul of the organization. The leader should always make sure his subordinates enjoy performing their duties as a team and make themselves a part of the organization's plans.
- A leader should **step into the shoes of the subordinates** and view things from subordinate's angle. He should empathize with them during difficult times. Empathizing with their personal problems makes them stronger-mentally and emotionally.

- A meaningful and challenging job accomplished inculcates a sense of achievement among employees. The **executive must make their employees feel they are performing an important work** that is necessary for the organization's well-being and success. This motivational aspect drives them to fulfill goals.

Remember, **"To become an efficient leader, you must be self-motivated"**. You must know your identity, your needs and you must have a strong urge to do anything to achieve your goals. Once you are self-motivated, only then you can motivate others to achieve their goals and to harmonize their personal goals with the common goals of the organization.

Types of Leadership Styles

German-American psychologist Kurt Lewin is credited with branding the basic leadership styles in 1939. Lewin and his researchers tasked schoolchildren with an arts and crafts project while the team observed behaviors and responses to different styles of leadership. The idea was to determine which style was most effective to use in business.

Lewin identified three styles of leadership: **Autocratic, Democratic, and Laissez-faire**. Over time, more leadership styles have emerged, and one that is commonly grouped in with Lewin's three is Transformational Leadership. Today, there are a variety of leadership styles in business, but the four primary leadership styles you'll be exposed to include:

- Autocratic
- Democratic
- Laissez-faire
- Transformational

Autocratic Leadership

Also known as Authoritarian Leadership, an Autocratic Leadership style can easily be summed up by the command, "Do as you're told."

In Autocratic Leadership, direction comes from the top, a singular figure who leads a company or team. An autocratic leader determines strategy, policies, procedures, and the direction of the organization, dictating everything to subordinates. Authoritarian leaders are not focused on collaboration with those in their circle, they are rarely interested in feedback, and they prefer to hold all of the power and be in charge.

In Lewin's research, he witnessed four behaviors and results of the Authoritarian Leadership style:

1. All determination of policy is by the leader.
2. Techniques and activity steps are dictated by the authority, one at a time, so that future steps or techniques are uncertain.
3. The leader usually dictates the particular work task and work companions of each member.

4. The dominator is “personal” in his praise and criticism of the work of each team member, but is aloof from active group participation, except when demonstrating. He is friendly or impersonal rather than openly hostile.

Examples of autocratic leaders include Martha Stewart, and, New England Patriots Head Coach Bill Belichick.

Qualities: Autocratic leaders often possess qualities subordinates look up to, such as decisiveness, self-confidence, and a steadfast, focused commitment to the goal.

When It Works: While Autocratic Leadership and the “Don’t question my commands” approach doesn’t sound like fun, there are occasions when this leadership style can be appropriate and effective, such as in urgent or chaotic situations that require someone to reign in the team and make a prompt and effective decision.

When It Doesn’t Work: Employees working under an autocratic leader may feel micromanaged, and because all directives come from one person at the top, they may become dependent on that person for direction and incapable of making business decisions on their own.

Democratic Leadership

Also known as Participative Leadership, the Democratic Leadership approach involves gathering input from your subordinates and team members so everyone has a chance to contribute to the decision-making process. Democratic leaders are still the decision-makers, but their approach allows others to feel engaged and have a stake in the final outcome. Democratic leaders excel at sparking creativity among subordinates, and projects are enhanced when positive contributions come from all sides.

Lewin’s research into the Democratic Leadership style uncovered these four behaviors and results:

1. All policies were a matter of group discussion and decision, encouraged and assisted by the leader.
2. Activity perspective was gained during the first discussion period. General steps to group goal were sketched, and where technical advice was needed, the leader suggested two or three alternative procedures from which a choice could be made.
3. The members were free to work with anyone, and division of tasks was left to the group leader.
4. The leader was “objective” or “fact-minded” in his praise and criticism and tried to be a regular group member in spirit without doing too much of the work.

Microsoft Corporation co-founder Bill Gates, Nelson Mandela, and Walt Disney, President of The Walt Disney Company, are often cited as examples of democratic leaders.

Qualities: Democratic leaders possess a curiosity that drives their desire for input from all sides. Their desire for a participative environment also makes them great communicators, and subordinates often find them easily approachable.

When It Works: A democratic approach to leadership yields positive results when the group feels part of the solution. This leads to more creative input and often heightens employee morale.

When It Doesn’t Work: Not every leader achieves success with the democratic approach. Inevitably, there will be employees who feel left out because their ideas or solutions were not chosen. Further, placing confidence in the group to posit solutions can be problematic if the group is not skilled or trained to answer the call.

Laissez-faire Leadership

Don’t let the name deceive you. Laissez-faire Leadership is not a “Who cares?” approach. Rather, it involves empowering your employees, being hands-off, and trusting them to accomplish the task at

hand without constant questions or micromanagement. Laissez-faire leaders leave decisions to their employees, while staying available to provide feedback when necessary.

According to Lewin, Laissez-faire leaders exhibit four common behaviors and results:

1. Complete freedom for group or individual decision, without any leader participation
2. Various materials supplied by leader, who made it clear that he would supply information when asked, but took no other part in work discussions
3. Complete nonparticipation by leader
4. Very infrequent comments on member activities unless questioned, and no attempt to participate or interfere with the course of events

Former U.S. presidents James Buchanan, Herbert Hoover, and Ronald Reagan, as well as industrialist Andrew Mellon, and businessman Warren Buffet are often cited as examples of Laissez-faire leaders.

Qualities: Laissez-faire leaders are excellent at delegating, and they instill confidence in employees when assigning them tasks without oversight. They are capable of providing constructive criticism when needed, and are often seen as trusting, as they willingly place responsibilities in the hands of employees.

When It Works: The Laissez-faire approach often leads to faster decision-making, as employees don't need to ask a higher up for approval. It is also especially effective in scenarios where the employees or groups are already trained and skilled for the task at hand. These workers are fully competent and don't require supervision, and when they're empowered by a Laissez-faire leader, they may feel more accomplished when they complete their task without a guiding hand or directive.

When It Doesn't Work: Hands-off can be problematic when your team doesn't fully understand the mission. Further, Laissez-faire leaders may find that without direction or oversight, employees don't accomplish as much, or anything at all. Unless you have complete confidence in your employees and their collective ability to complete a task without close supervision, you may reconsider this approach.

Transformational Leadership

Transformational Leadership involves developing a grand vision and rallying your employees around it. Under this style, the team is eager to transform and evolve – personally and professionally – in order to achieve the overall goal. With the organization and employees aligned, teams working under a transformational leader are united for the singular cause, and willing to commit their effort, time, and energy to the organization.

Transformational Leadership Qualities:

1. Understanding what needs to change
2. Ability to stimulate the intellect
3. Knack for encouraging participation
4. Talent for genuine communication
5. Loyalty

6. Sense of the bigger picture

7. Personal integrity

8. An inspiring bearing/presence

When It Works: Transformational Leadership allows employees to see clearly the vision and goals for the organization, and employees remain loyal and productive while working to accomplish their mission. Transformational Leadership creates workplace harmony as everyone is working together, and the lines of communication are always open between employees and leadership.

When It Doesn't Work: While a fully engaged and committed group is what every leader wants, Transformational Leadership has been known to contribute to burnout as employees work continuously to achieve goals. This approach also requires constant communication and feedback between leadership and the employees, and if those lines are severed in any way, the latter can feel left out of the big picture.

Motivation

Definition and characteristics

What is Motivation?

Motivation is a psychological process through which a person acts or behaves towards a particular task or activity from start to completion. Motivation drives or pushes a person to behave in a particular way at that point in time. When the motivation is positive, a person is happy, energetic, enthusiastic & self-driven to perform the work and when it is negative motivation, person is demoralized, sad, lethargic & pessimistic leading to drop in productivity and

Definition

Motivation is regarded as “the inner state that energizes activities and directs or channels behavior towards the goal”.

Motivation is the process that arouses action, sustains the activity in progress and that regulates the pattern of activity.

Entrepreneurial motivation

The entrepreneurial motivation is the process that activates and motivates the entrepreneur to exert higher level of efforts for the achievement of his/her entrepreneurial goals. In other words, the entrepreneurial motivation refers to the forces or drive within an entrepreneur that affect the direction, intensity, and persistence of his / her voluntary behaviour as entrepreneur. So to say, a motivational entrepreneur will be willing to exert a particular level of effort (intensity), for a certain period of time (persistence) toward a particular goal (direction).

Nature of Motivation

The nature of motivation emerging out of above definitions can be expressed as follows:

1. Motivation is internal to man

Motivation cannot be seen because it is internal to man. It is externalized via behavior. It activates the man to move toward his / her goal.

2. A Single motive can cause different behaviors

A person with a single desire or motive to earn prestige in the society may move towards to join politics, attain additional education and training, join identical groups, and change his outward appearance.

3. Different motives may result in single behaviour

It is also possible that the same or single behaviour may be caused by many motives. For example, if a person buys a car, his such behaviour may be caused by different motives such as to look attractive, be respectable, gain acceptance from similar group of persons, differentiate the status, and so on.

4. Motives come and go

Like tides, motives can emerge and then disappear. Motives emerged at a point of time may not remain with the same intensity at other point of time. For instance, an entrepreneur overly concerned about maximization of profit earning during his initial age as entrepreneur may turn his concern towards other higher things like contributing towards philanthropic activities in social health and education once he starts earning sufficient profits.

5. Motives interact with the environment

The environment in which we live at a point of time may either trigger or suppress our motives. You probably have experienced environment or situation when the intensity of your hunger picked up just you smelled the odour of palatable food.

You may desire an excellent performance bagging the first position in your examination but at the same time may also be quite sensitive to being shunned and disliked by your class mates if you really perform too well and get too much of praise and appreciation from your teachers. Thus, what all this indicates is that human behaviour is the result of several forces differing in both direction and intent.

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Importance of Motivation

It is an important psychological factor for any individual as it defines the work, ambition and drive of that person to do any work. A person with high levels of motivation is motivated to do good quality work, help others, spread their energy and focus on achieving goals. On the contrary, a person with low levels of motivation, demotivates others, works shabbily and creates a negative atmosphere.

It is an important human factor in an individual's personal as well as professional life. Positive motivation for people is required in every field like business, sports, politics, entrepreneurship etc. It is the desire of an individual to work towards a motive, which is a certain task. In business, good

motivation helps employees learn important managerial skills like leadership, team management, time management, decision making, communication etc.

4 Types of Motivation



It is driven by several factors which influences the behavior and attitude of an individual. Based on the different factors and the kind of impact it has on a person, there are different types of motivation. The different types of motivation in people are:

1. Intrinsic Motivation

This type comes from within a person to do a task or achieve a particular goal. It is a feeling of being self-driven and achieving objectives for oneself. Intrinsic motivation is driven by motives like social acceptance, eating food, desires to achieve goals, biological needs etc.

2. Extrinsic Motivation

This type drives an individual due to external forces or parameters. Some other person or organization motivates the individual to work hard to achieve certain goals or tasks. Extrinsic motivation is driven by motives like financial bonus, rewards, appreciation, promotion, punishment, demotion etc.

3. Positive Motivation

This type drives an individual by offering positive accolades and rewards for performing a task. In this type of motivation, the individual is rewarded by monetary benefits, promotions etc. which drives an individual to work hard.

4. Negative Motivation

This is where fear and threat are used as a parameter to get the work done. In this type of motivation, individuals are threatened with things like demotion, reducing benefits, withdrawing merits etc.

For every individual, all the types are interlinked based on which he or she takes an action. The resultant behavior of any person is basis the motivation types he or she has been influenced by.

Top Factors Influencing Motivation



Keeping employees motivated is the biggest challenge for companies for ensuring that they give a high productive output at work and help in achieving company goals. A positive motivation amongst employees helps drive the business positively & enhances creativity. On the other hand, a demotivated employee will not contribute efficiently and slowdown progress at workplace. The key elements & top factors which influence employees in business or people in general are as follows:

1. Salary

Monetary compensation & benefits like gross salary, perks, performance bonuses etc. are the biggest motivation factors. The better the salary and monetary benefits, the higher is the motivation level & passion of a person towards a job.

2. Recognition

Rewards, recognition etc. are important for ensuring high enthusiasm levels for an employee. If the hard work of an individual is appreciated, it keeps them motivated to perform better.

3. Work Ethics

Ethical working environment, honesty etc. are important factors for any individual. Good work ethics in a company helps keep employees motivated at work place.

On the other hand, if the work environment is not ethical, then the workforce might be demotivated.

4. Transparency with Leadership

The leadership in an organization helps in employee motivation if there are transparent discussion and flatter hierarchies. The senior management has to ensure that all subordinates are happy, focused & motivated.

5. Culture at Work

A good, vibrant, positive culture at workplace is always an important factor. People from different backgrounds, religions, countries etc. working together helps create a social bond at workplace.

6. Learning and Development

Another factor influencing is the training and development opportunities that a person gets. L&D helps individuals develop more skills and have better opportunities in their professional career.

7. Work Life Balance

Having a good quality of work life (QWL) helps in the motivation of people. A good work life balance ensures that a person can give quality time to both office work as well as family.

8. Career Growth Opportunities

Career development opportunities have a positive influence on the motivation of any person. If a person knows their future & career path is secure, they tend to work with more passion.

9. Health Benefits

Health benefits, insurance & other incentives act as a source of motivation for people. If the medical bills, hospitalization charges etc. are taken care of by the company, it helps build a strong trust.

10. Communication

A positive & transparent communication between managers and subordinates gives a sense of belonging and adds to the employee's motivation. Discussion related to work as well as personal life help make a friendly bond at workplace.

There are not finite factors influencing positive attitude of an employee. These keep on changing depending upon the type of environment, job responsibility, experience in life etc. Hygiene Factors of motivation are also given by the Hygiene Theory.

Advantages of Motivation

There are several advantages of an employee being motivated at work. Some of the main benefits of motivation for employees and companies are as follows:

1. Feeling of belongingness and self-respect.
2. A motivated employee is excited to learn and contribute more.
3. Higher productive output due to positive motivation.
4. Reduced absenteeism and lower attrition.
5. Employees high on motivation help reduce costs & improve profits.
6. Reduce stress & anxiety at workplace.

Disadvantages of Motivation

Despite several advantages, there are some probable drawbacks as well. Some of them are:

1. It is a relative feeling and hence there is no way of ensuring that everyone would feel the same way.
2. Motivating employees in a company requires additional efforts, money and time on employee related activities.
3. It among people is mostly a short-term feeling. Afterwards a person become demotivated or even uninterested about a particular task.

Examples of Motivation

Motivation is relevant in every field of life for any individual. There can be many examples based on type, situation, field of work etc. Some examples are as follows.

1. Consider a person who has joined a university. After a lot of hard work, he or she gets admission in their preferred course. Hence the intrinsic motivation for the individual would be perform well in academics, get a good score, learn new skills and get a job opportunity with a good company. Since this is an internal feeling, the driving motives are achieving a personal goal.
2. An example of extrinsic motivation can be seen from a footballer, cricketer or any other sportsperson. Any sportsperson wants to excel in their sport not only for themselves but to also become a crowd favorite and get their attention. Hence, he or she gets highly motivated by this external factor which drives them to perform better in their sport.

Maslow's Hierarchy of Needs Theory

One of the most popular needs theories is **Abraham Maslow's hierarchy of needs theory**. Maslow proposed that motivation is the result of a person's attempt at fulfilling five basic needs: physiological, safety, social, esteem and self-actualization. According to Maslow, these needs can create internal pressures that can influence a person's behavior.

Physiological needs are those needs required for human survival such as air, food, water, shelter, clothing and sleep. As a manager, you can account for the physiological needs of your employees by providing comfortable working conditions, reasonable work hours and the necessary breaks to use the bathroom and eat and/or drink.

Safety needs include those needs that provide a person with a sense of security and well-being. Personal security, financial security, good health and protection from accidents, harm and their adverse effects are all included in safety needs. As a manager, you can account for the safety needs of your employees by providing safe working conditions, secure compensation (such as a salary) and job security, which is especially important in a bad economy.

Social needs, also called **love and belonging**, refer to the need to feel a sense of belonging and acceptance. Social needs are important to humans so that they do not feel alone, isolated and depressed. Friendships, family and intimacy all work to fulfill social needs. As a manager, you can account for the social needs of your employees by making sure each of your employees know one another, encouraging cooperative teamwork, being an accessible and kind supervisor and promoting a good work-life balance.

Esteem needs refer to the need for self-esteem and respect, with self-respect being slightly more important than gaining respect and admiration from others. As a manager, you can account for the esteem needs of your employees by offering praise and recognition when the employee does well, and offering promotions and additional responsibility to reflect your belief that they are a valued employee.

Self-actualization needs describe a person's need to reach his or her full potential. The need to become what one is capable of is something that is highly personal. While I might have the need to be a good parent, you might have the need to hold an executive-level position within your organization. Because this need is individualized, as a manager, you can account for this need by providing challenging work, inviting employees to participate in decision-making and giving them flexibility and autonomy in their jobs.



Methods of Improving Motivation

1. Lead with vision

Everyone wants to know that their efforts are driving towards something. What's the next step? What does success look like for the company? A destination helps to motivate the journey, so make sure the vision for the company is clear.

2. Make sure everyone understands the 'why'

Your employees will know what needs to be done, but you need to explain further; you need to communicate the 'why' of each task. The why is the company's overall mission. If everyone knows how their individual actions can personally add to the overall goal of the company, it brings much-needed intrinsic motivation to even the most simple task.

3. Set frequent clear targets

You obviously have big targets that you want to hit as a company, but smaller goals are the key to motivation. All goals should add to the overall target, but breaking this into more attainable chunks feels less overwhelming. If employees are frequently hitting targets, the feeling of satisfaction grows and will act as a great motivator to continue on to the next set of goals.

4. Recognise and reward great work

Employees need to know that their managers appreciate their hard work. Giving well-deserved recognition not only increases self-esteem but also enthusiasm and team morale.

A recognition platform is an effective tool to celebrate star performers who embody your company values. It's important to support employees all year round with team-building exercises, wellbeing schemes, secondment opportunities and EAP programs. However, for more special occasions, such as a 10-year work anniversary or employee of the month, we recommend going a step further and rewarding your teams.

The reward doesn't necessarily have to be monetary, it could be a gesture, such as giving them a day off. Rewards are particularly good promoters of motivation and job satisfaction. So if you want to encourage your employees to go the extra mile, make their effort worth it with a gift or thoughtful act.

5. Give your team autonomy

Time is precious. So when we don't feel in control of our time and energy, motivation levels can really drop. Allowing for some elements of freedom in the workplace, whether that's flexible working hours or unlimited time off, demonstrates trust from leaders to employees. This adds motivation, as the satisfaction of a job well done comes with the feeling that they were in control and did it on their terms.

6. Create a welcoming workplace environment

No one wants to sit in a gloomy office and desperately wait for home time every day. If workplaces create a friendly culture, with areas for rest and play, employees will look forward to coming into work. The saying 'work hard, play hard' is important here. As motivation and mood go hand in hand, a poor mood can affect the ability to concentrate and will lower the feeling of energy in the workplace.

7. Offer impressive benefits

Make everyone feel that they are working in the best place they can be. Offering employee benefits and perks, such as the wide range available through our perks platform, and fringe benefits that aim to make your people's lives better both in and outside of work, helps to boost the mood and sense of loyalty to the company. Make sure your benefits suit your employees' unique needs; for instance, if they live in London, they may require a London weighted allowance.

8. Encourage teamwork

Collaboration between teams in the company allows ideas to be developed further. Working with those with different skill sets will, in turn, create more innovative results. In teams, there's power in numbers and anyone experiencing a lack of motivation should be boosted by those around them.

9. Create a career path

No one wants to be static for long. We all want to know that we are going somewhere and focus on that next step. Ask employees what they want from their career, and lay out what they need to do to get there. Have growth conversations with team members to design a career path; this will help to create the drive to reach the next stage and feel that they have a long and productive journey ahead within the company.

10. Support staff motivation by supporting employee wellbeing

When organisations are implementing motivation strategies or employee incentive schemes, they often overlook wellbeing.

There's no dispute that using rewards as an incentive is a great motivator. However, if an employee is feeling tired or overwhelmed they won't produce their best work – no matter how hard they try.

Taking a well-rounded approach to wellbeing, so addressing your teams' mental, emotional, and physical health is a great way of keeping them healthy, happy, and at the top of their game.

Why is communication important in business?

Communication in business is important to convey clear, strong messages about strategy, customer service and branding. A business building a brand reflects a consistent message tailored to its audience. Internal communication builds rapport among employees and managers and encourages teamwork and collaboration.



Good communicators are vital to a business's profit margin and reputation. Employees who communicate well and understand the company's vision help make the company successful. Using effective communication skills can benefit a business and its employees in a variety of ways, including:

1. Building better teams

Effective communication builds a positive atmosphere where teams can flourish. When communication is positive and encouraging, team members become stronger and work better together. Those who practice good communication skills make working beside them easier and less stressful. Job tensions or friction are promptly addressed since effective communicators work toward finding solutions.

2. Preventing misunderstandings and conflicts

Listening is a part of communicating used to understand a situation fully. Good communicators listen well and react appropriately, and they're more likely to find solutions without becoming defensive. When conflicts arise, good communicators address the problem right away and listen to the other side.

3. Improving customer service

Businesses need to know what their customers want and need from them to serve them. Forming business relationships is how companies build trust in their brand and bring customers back. Reliable and positive communication with customers is paramount to maintaining a valued customer service reputation.

Effective communication with customers by answering questions and providing solutions helps to improve the business's reputation. Communicating well over the phone or through social media or email improves customer confidence and loyalty. Written communication that is consistent with the brand's voice can help promote community between customers and organizations.

4. Meeting goals and earning success

For a business to be successful, short- and long-term goals must be clear and concise. When employees know what the goals and visions of their company are, they are better able to focus their efforts on achieving them.

Communicate goals clearly, and regularly remind employees of the team or individual goals to keep them motivated and encouraged. It can also help employees understand the importance of their roles in making the company successful, which can improve loyalty within the company and reduce hiring turnover.

5. Promoting creativity and innovation

People who are good communicators are usually open to sharing ideas without judgment. When trust is built based on effective communication, team members are more apt to share with each other to inspire creativity.

Effective communicators are more inclined to collaborate to find creative solutions, as well. When employees are keen to share ideas, companies can transform their approaches and find unique ways to serve customers and clients.

6. Advancing individual career prospects

Good communication skills, such as open and honest communication, eliminate surprises and reinforce your commitment to solve problems and support the business. This can help you earn promotions and secure leadership positions in your current organization or pursue new advanced career opportunities elsewhere.

Barriers To Effective Communication

The process of communication has multiple barriers. The intended communicate will often be disturbed and distorted leading to a condition of misunderstanding and failure of communication. The Barriers to effective communication could be of many types like linguistic, psychological, emotional, physical, and cultural etc. We will see all of these types in detail below.

Linguistic Barriers

The language barrier is one of the main barriers that limit effective communication. Language is the most commonly employed tool of communication. The fact that each major region has its own language is one of the Barriers to effective communication. Sometimes even a thick dialect may render the communication ineffective.

As per some estimates, the dialects of every two regions changes within a few kilometers. Even in the same workplace, different employees will have different linguistic skills. As a result, the communication channels that span across the organization would be affected by this.

Thus keeping this barrier in mind, different considerations have to be made for different employees. Some of them are very proficient in a certain language and others will be ok with these languages.

Psychological Barriers

There are various mental and psychological issues that may be barriers to effective communication. Some people have stage fear, speech disorders, phobia, depression etc. All of these conditions are very difficult to manage sometimes and will most certainly limit the ease of communication.

Emotional Barriers

The emotional IQ of a person determines the ease and comfort with which they can communicate. A person who is emotionally mature will be able to communicate effectively. On the other hand, people who let their emotions take over will face certain difficulties.

A perfect mixture of emotions and facts is necessary for effective communication. Emotions like anger, frustration, humour, can blur the decision-making capacities of a person and thus limit the effectiveness of their communication.



Physical Barriers to Communication

They are the most obvious barriers to effective communication. These barriers are mostly easily removable in principle at least. They include barriers like noise, closed doors, faulty equipment used for communication, closed cabins, etc. Sometimes, in a large office, the physical separation between various employees combined with faulty equipment may result in severe barriers to effective communication.

Cultural Barriers of Communication

As the world is getting more and more globalized, any large office may have people from several parts of the world. Different cultures have a different meaning for several basic values of society. Dressing, Religions or lack of them, food, drinks, pets, and the general behaviour will change drastically from one culture to another.

Hence it is a must that we must take these different cultures into account while communication. This is what we call being culturally appropriate. In many multinational companies, special courses are offered at the orientation stages that let people know about other cultures and how to be courteous and tolerant of others.

Organisational Structure Barriers

As we saw there are many methods of communication at an organizational level. Each of these methods has its own problems and constraints that may become barriers to effective communication. Most of these barriers arise because of misinformation or lack of appropriate transparency available to the employees.

Attitude Barriers

Certain people like to be left alone. They are the introverts or just people who are not very social. Others like to be social or sometimes extra clingy! Both these cases could become a barrier to communication. Some people have attitude issues, like huge ego and inconsiderate behaviours.

These employees can cause severe strains in the communication channels that they are present in. Certain personality traits like shyness, anger, social anxiety may be removable through courses and proper training. However, problems like egocentric behaviour and selfishness may not be correctable.

Perception Barriers

Different people perceive the same things differently. This is a fact which we must consider during the communication process. Knowledge of the perception levels of the audience is crucial to effective communication. All the messages or communicate must be easy and clear. There shouldn't be any room for a diversified interpretational set.

Physiological Barriers

Certain disorders or diseases or other limitations could also prevent effective communication between the various channels of an organization. The shrillness of voice, dyslexia, etc are some examples of physiological barriers to effective communication. However, these are not crucial because they can easily be compensated and removed.

Technological Barriers & Socio-religious Barriers

Other barriers include the technological barriers. The technology is developing fast and as a result, it becomes difficult to keep up with the newest developments. Hence sometimes the technological advance may become a barrier. In addition to this, the cost of technology is sometimes very high.

Most of the organizations will not be able to afford a decent tech for the purpose of communication. Hence, this becomes a very crucial barrier. Other barriers are socio-religious barriers. In a patriarchal society, a woman or a transgender may face many difficulties and barriers while communicating.



THEORY – 1

ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY

5TH SEMESTER, MECHANICAL ENGINEERING

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Chapter – 7

WORK CULTURE,TQM & SAFETY

TOPIC TO BE COVERED :-

- **Human relationship and Performance in Organization**
- **Relations with Peers, Superiors and Subordinates**
- **TQM concepts: Quality Policy, Quality Management, Quality system**
- **Accidents and Safety. Cause, preventive measures, General Safety Rules, Personal Protection Equipment(PPE)**

UNIT-7 Work Culture, TQM & Safety

- Human relationship and Performance in Organization
- Relations with Peers, Superiors and Subordinates
- TQM concepts: Quality Policy, Quality Management, Quality system
- Accidents and Safety, Cause, preventive measures, General Safety Rules ,
- Personal Protection Equipment(PPE)

Human relationship and Performance in Organization

Human relations is critical for developing and maintaining a positive work environment, retaining employees and encouraging productivity. By making human relations the focus of your management approach, you can effectively create a workplace culture in which your employees can thrive. Developing your human relations skills can help you modify your management style so it's human relations-centric.

What is human relations?

Human relations refers to the ability to interact in a healthy manner with others and build strong relationships. From the perspective of managers in a company, it involves the process of creating systems and communication channels to enable group employee relationships as well as strong one-on-one relationships. Additionally, it includes the process of training people for specific roles, addressing their needs, resolving conflicts between employees or between management and employees and creating a positive workplace culture.

Why is human relations important?

Human relations is critical in business for a variety of reasons, including:

- **Employee productivity:** When relationships between a company's managers and its employees are supportive and positive, productivity is shown to increase. Additionally, when employees are dependent upon each other with their work, it directly influences productivity. When employees feel that they're treated with respect and recognized for contributing to a company's success, they are more likely to produce quality work.
- **Motivation:** When employees recognize that performing job-related tasks will allow them to feel appreciated and valued, they are more motivated to do them.
- **Positive perception:** An employee's interpersonal and communication skills impact the perception that other employees have about their ability to positively contribute to the workplace. A positive perception of an employee's work and attitude could create opportunities for future advancement.
- **Employee retention:** Employees who feel they're treated respectfully by their employer are more likely to continue working for them for a longer period of time. By using human relations to establish a feeling of mutual trust and value, a company creates an environment where employees feel that they matter and are less likely to pursue other opportunities.
- **Creativity:** In the workplace, creativity is often dependent on the employee's ability to communicate and share ideas with their colleagues. By creating a positive workplace culture and nurturing workplace relationships and teamwork, a business can encourage creativity and more quickly develop products and services to meet the consumer's changing needs.

Employee Collaboration and Workplace Culture

Human relations in the workplace are a major part of what makes a business work. Employees must frequently work together on projects, communicate ideas and provide motivation to get things done. Without a stable and inviting workplace culture, difficult challenges can arise both in the logistics of

managing employees and in the bottom line. Businesses with engaging workplaces and a well-trained workforce are more likely to retain and attract qualified employees, foster loyalty with customers and more quickly adapt to meet the needs of a changing marketplace.

Improving Employee Retention

The quality of workplace relations is critical to employee retention. Employee retention may seem trivial – especially in a workplace that is used to a high turnover – but managers must remember that turnover is financially very costly. Every new employee requires a substantial investment of time and energy in their recruitment and training.

In addition, severing ties with old employees can sometimes be challenging, especially if the circumstances are not particularly amicable. Making sure quality employees remain interested and engaged in the business requires patience, compassion and flexibility, but can actually make the business more financially sound.

Motivation and Productivity

Workplace relationships provide a source of employee motivation, which is important to maintaining productivity. Employees who are interested in their work and in the well-being of other employees tend to be more productive than those who are not. This productivity pays obvious financial dividends to the company, as it can get more done in less time with fewer costs. Building relationships, by both recognizing an employee's value to the company and a concern for their needs, often goes a long way.

Fostering Employee Creativity

The modern business environment often rewards businesses that are able to quickly develop products that meet changing consumer needs. In some industries – such as technology, for example – employees' ability to come up with effective new ideas is often the difference between the entire company's success and failure. Employees' creativity is often dependent on their ability to communicate with other employees and share ideas. Without quality workplace relationships, employees are less likely to be able to develop and share the solutions that a business needs to survive.

TQM concepts: Quality Policy, Quality Management, Quality system

Total Quality Management (TQM) is a management framework based on the belief that an organization can build long-term success by having all its members, from low-level workers to its highest ranking executives, focus on improving quality and, thus, delivering customer satisfaction.

A core definition of total quality management (TQM) describes a management approach to long-term success through customer satisfaction. In a TQM effort, all members of an organization participate in improving processes, products, services, and the culture in which they work.

PRIMARY ELEMENTS OF TQM

TQM can be summarized as a management system for a customer-focused organization that involves all employees in continual improvement. It uses strategy, data, and effective communications to integrate the quality discipline into the culture and activities of the organization. Many of these concepts are

present in modern quality management systems, the successor to TQM. Here are the 8 principles of total quality management:

1. **Customer-focused:** The customer ultimately determines the level of quality. No matter what an organization does to foster quality improvement—training employees, integrating quality into the design process, or upgrading computers or software—the customer determines whether the efforts were worthwhile.
2. **Total employee involvement:** All employees participate in working toward common goals. Total employee commitment can only be obtained after fear has been driven from the workplace, when empowerment has occurred, and when management has provided the proper environment. High-performance work systems integrate continuous improvement efforts with normal business operations. Self-managed work teams are one form of empowerment.
3. **Process-centered:** A fundamental part of TQM is a focus on process thinking. A process is a series of steps that take inputs from suppliers (internal or external) and transforms them into outputs that are delivered to customers (internal or external). The steps required to carry out the process are defined, and performance measures are continuously monitored in order to detect unexpected variation.
4. **Integrated system:** Although an organization may consist of many different functional specialties often organized into vertically structured departments, it is the horizontal processes interconnecting these functions that are the focus of TQM.
5.
 1. Micro-processes add up to larger processes, and all processes aggregate into the business processes required for defining and implementing strategy. Everyone must understand the vision, mission, and guiding principles as well as the quality policies, objectives, and critical processes of the organization. Business performance must be monitored and communicated continuously.
 2. An integrated business system may be modeled after the Baldrige Award criteria and/or incorporate the ISO 9000 standards. Every organization has a unique work culture, and it is virtually impossible to achieve excellence in its products and services unless a good quality culture has been fostered. Thus, an integrated system connects business improvement elements in an attempt to continually improve and exceed the expectations of customers, employees, and other stakeholders.
6. **Strategic and systematic approach:** A critical part of the management of quality is the strategic and systematic approach to achieving an organization's vision, mission, and goals. This process, called strategic planning or strategic management, includes the formulation of a strategic plan that integrates quality as a core component.
7. **Continual improvement:** A large aspect of TQM is continual process improvement. Continual improvement drives an organization to be both analytical and creative in finding ways to become more competitive and more effective at meeting stakeholder expectations.
8. **Fact-based decision making:** In order to know how well an organization is performing, data on performance measures are necessary. TQM requires that an organization continually collect and analyze data in order to improve decision making accuracy, achieve consensus, and allow prediction based on past history.
9. **Communications:** During times of organizational change, as well as part of day-to-day operation, effective communications plays a large part in maintaining morale and in motivating employees at all levels. Communications involve strategies, method, and timeliness.

TQM requires organizations to focus on continuous improvement, or kaizen. It focuses on process improvements over the long term, rather than simply emphasizing short-term financial gains.

TQM prescribes a series of ways for organizations to accomplish this, with the pathway to successful continuous improvement centered on the use of strategy, data and effective communication to instill a discipline of quality into the organization's culture and processes.

More specifically, TQM puts a spotlight on the processes that organizations use to produce their products, and it calls for organizations to define those processes, continuously monitor and measure their performance, and use that performance data to drive improvements. Furthermore, it calls for all employees, as well as all organizational departments, to be part of this process.

TQM's objectives are to eliminate waste and increase efficiencies by ensuring that the production process of the organization's product (or service) is done right the first time.

This management framework was initially applied to companies in the manufacturing sector, but, over the decades, organizations in other sectors have adopted it, as well.

Quality Policy

The quality policy is where the company has stated its promise. The promise to strive for consistent quality and constant improvement. The quality policy is a short document created by the executive management team.

It displays exactly what quality means to their company specifically. The purpose of their product or service and the strategic direction they are planning to take to achieve these goals.

You must show this document to all employees so all are aware and the company is aligned with their objective. The document is also made public to be accessed by customers and investors for reference and reassurance.

In short, a quality policy describes your business, what it offers and your commitment to delivering the highest quality product. Customer requirements are accounted for in the quality policy. Quality objectives are the goals linked to meeting customer requirements. These objectives are within the quality policy statements.

Three Key Elements

The quality policy should really have three key elements.

1. It should be developed by members of senior management.
2. It should show commitment to quality and customer satisfaction.
3. It should be relatively easy to generate key quality objectives from it.

A Quality Policy is a requirement of any formalized quality management system (QMS), and its purpose is to set the framework for the commitment of the scope of the QMS for internal and external stakeholders.

A Quality Policy is typically a brief statement that aligns with an organization's purpose, mission, and strategic direction. It provides a framework for quality objectives and includes a commitment to meet applicable requirements (ISO 9001, customer, statutory, or regulatory) as well as to continually improve.

But a Quality Policy can be so much more. It can become a way to drive passion for cultural change within an organization by incorporating pieces of it into routine meetings and embedding it into employee objectives and performance measurement.

For example, some companies will incorporate a quality objective directly into an employee's annual goals. Examples could include being involved in a continual improvement project or simply maintaining compliance.

Most companies will post their Quality Policy on their websites and within company buildings as a visual reminder to employees, customers, and suppliers about their commitment to quality.

Here is our Quality Policy that we believe reflects the everyday way of life and commitment to quality practiced at Thermo Fisher Scientific:

Quality Policy

We fulfill our Mission to enable our customers to make the world healthier, cleaner, and safer by continuously improving the quality of our products and services and by ensuring global regulatory compliance.

- Quality for our customers means they can rely on our products and services to consistently meet their specifications and requirements.
- Quality for our colleagues means we take personal ownership to ensure our work meets customer requirements and is error free from design through use.
- Quality for regulatory authorities means that we operate at the highest ethical standards and meet or exceed all applicable regulatory requirements.
- Quality for our company means we drive a continuous improvement culture that is enabled by practical process improvement (PPI) and our company's quality system.

What Is Quality Management?

Quality management is the act of overseeing all activities and tasks that must be accomplished to maintain a desired level of excellence. This includes the determination of a quality policy, creating and implementing quality planning and assurance, and quality control and quality improvement. It is also referred to as total quality management (TQM).

A Quality Management System, or QMS, is essential for improving your business's operations and enabling it to meet the requirements of customers. Many types of quality management systems are built around ISO 9000, a framework requiring all business processes to be documented and for people to follow these closely. Whether you manage all your processes in-house or outsource to, for example, a , a QMS allows your organization to remain compliant with the latest standards and regulations.

Once your company is ISO certified, implementing Total Quality Management (TQM) enables you to evaluate all processes to improve efficiency and reduce waste. TQM can be implemented in all facets of your business, from the front office to the production floor.

In general, quality management focuses on long-term goals through the implementation of short-term initiatives.

- Quality management is the act of overseeing all activities and tasks needed to maintain a desired level of excellence.

- Quality management includes the determination of a quality policy, creating and implementing quality planning and assurance, and quality control and quality improvement.
- TQM requires that all stakeholders in a business work together to improve processes, products, services and the culture of the company itself.

Understanding Quality Management

At its core, TQM is a business philosophy that champions the idea that the long-term success of a company comes from customer satisfaction and loyalty. TQM requires that all stakeholders in a business work together to improve processes, products, services and the culture of the company itself.

While TQM seems like an intuitive process, it came about as a revolutionary idea. The 1920s saw the rise in reliance on statistics and statistical theory in business, and the first-ever known control chart was made in 1924. People began to build on theories of statistics and ended up collectively creating the method of statistical process control (SPC). However, it wasn't successfully implemented in a business setting until the 1950s.¹

It was during this time that Japan was faced with a harsh industrial economic environment. Its citizens were thought to be largely illiterate, and its products were known to be of low quality. Key businesses in Japan saw these deficiencies and looked to make a change. Relying on pioneers in statistical thinking, companies such as Toyota integrated the idea of quality management and quality control into their production processes.

By the end of the 1960s, Japan completely flipped its narrative and became known as one of the most efficient export countries, with some of the most admired products. Effective quality management resulted in better products that could be produced at a cheaper price.

Real-World Example of Quality Management

The most famous example of TQM is Toyota's implementation of the Kanban system. A kanban is a physical signal that creates a chain reaction, resulting in a specific action. Toyota used this idea to implement its just-in-time (JIT) inventory process. To make its assembly line more efficient, the company decided to keep just enough inventory on hand to fill customer orders as they were generated.

Therefore, all parts of Toyota's assembly line are assigned a physical card that has an associated inventory number. Right before a part is installed in a car, the card is removed and moved up the supply chain, effectively requesting another of the same part. This allows the company to keep its inventory lean and not overstock unnecessary assets.²

A quality system is a structure for managing the quality of the output of a manufacturer.

We have a very stringent quality system for inspecting items and delivering the best products.

A good quality system prevents errors from occurring rather than correcting them after they have happened.

A quality system is a structure for managing the quality of the output of a manufacturer.

Accidents in the workplace

Your employer has a duty to protect you and tell you about health and safety issues that affect you. They must also report certain accidents and incidents, pay you sick pay and give you time off because of an accident at work should you need it.

Reporting an accident at work

Your employer must report serious work-related accidents, diseases and dangerous incidents to the Health and Safety Executive for Northern Ireland (HSENI) or the Health and Safety department at your local authority. They must report:

- death
- major injuries, a broken arm or ribs for example
- dangerous incidents like the collapse of scaffolding, people overcome by gas
- any other injury that stops an employee from doing their normal work for more than three days
- disease

The reporting must be done by your employer, but if you're involved it's a good idea to make sure it has been reported.

Health and safety at work

Your employer has to carry out a risk assessment and do what's needed to take care of the health and safety of employees and visitors. This includes deciding how many first aiders are needed and what kind of first aid equipment and facilities should be provided.

First aiders have no statutory right to extra pay, but some employers do offer this. Employees must also take reasonable care over their own health and safety.

- Employees' health and safety responsibilities
- Employers' health and safety responsibilities

Recording accidents

Any injury at work - including minor injuries - should be recorded in your employer's 'accident book'.

All employers (except for very small companies) must keep an accident book. It's mainly for the benefit of employees, as it provides a useful record of what happened in case you need time off work or need to claim compensation later on. But recording accidents also helps your employer to see what's going wrong and take action to stop accidents in future.

Sick pay

In most cases, if you need time off because of an accident at work, you'll only have the right to Statutory Sick Pay. Your employer may have a scheme for paying more for time off caused by accidents, or may decide to pay extra depending on what has happened.

Making an injury claim

If you've been injured in an accident at work and you think your employer is at fault, you may want to make a claim for compensation. Any claim must be made within three years of the date of the accident and you'll normally need a lawyer. If you belong to a trade union, you may be able to use their legal services. Or, you should speak to a specialist personal injury lawyer.

By law, your employer must be insured to cover a successful claim and should place a certificate with the name of their employer's insurance company where it can be seen at work. If not, they must give you the details if you need them.

If you're considering suing your employer, remember that the aim of legal damages is to put you in the position you would be in had the accident not happened - it's not about getting hold of some 'free' money. There are also court costs and legal fees to think about.

If you have an accident in the workplace, you should:

- make sure you record any injury in the 'accident book'
- if need be, make sure your employer has reported it to the HSENI
- check your contract or written statement of employment for information about sick or accident pay
- if there's a dispute, try to sort it out with your employer

PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR INFECTION CONTROL

Personal Protective Equipment (PPE) is specialized clothing or equipment worn by an employee for protection against infectious materials.

PPE prevents contact with an infectious agent or body fluid that may contain an infectious agent, by creating a barrier between the potential i Importance

According to the hierarchy of controls by the National Institute for Occupational Safety and Health (NIOSH), PPE (sometimes also referred to as PPE equipment)—is recommended to be the last level of defense to prevent occupational injuries, illnesses, and fatalities, but some businesses combined it with other control measures to ensure a safe and healthy environment for their workers. Here are some benefits of using PPEs:

- prevent unnecessary injury in the workplace;
- protect employees from excessive chemical exposure;
- prevent the spread of germs and infectious diseases including COVID-19;
- help businesses comply with regulatory requirements(e.g., The Personal Protective Equipment at Work Regulations 1992 that's recently been extended to limb workers); and
- Improve employee productivity and efficiency.

The 4 Basic Types

However, even the strictest controls will not necessarily eliminate all the risks associated with most job tasks and this is where the need for PPE must be evaluated. A hazard assessment can help identify which specialized PPE will be required. There are numerous types of workplace safety equipment available depending on the hazard exposure and work conditions. The following are basic PPE that can help protect employees:



Face and Eye Protection

PPE includes safety goggles and face shields and should be used for tasks that can cause eye damage or loss of vision, sprays of toxic liquids, splashes, and burns.

Safety Tips:

- Check if safety glasses comply with the ANSI Z87.1 eye protection standard.
- Ensure that there are no cracks or deformities on the lenses.
- Ensure the strap is in good working condition and is firmly sealed to the cheek and forehead.
- Clean and disinfect after use.



Respiratory Protection

PPE includes full-face respirators, self-contained breathing apparatus, gas masks, N95 respirators, and surgical masks are used for a task that can cause inhalation of harmful materials to enter the body. This includes harmful gas, chemicals, large-particle droplets, sprays, splashes, or splatter that may contain viruses and bacteria such as COVID-19, viral infections, and more.

Safety Tips:

- Ensure that the equipment is fit-tested and the employee has undergone proper training before wearing one.
- Carefully read the instructions to determine if it is designed to help protect against the hazards you may face.
- Change filters on half-mask or full-mask respirators frequently.

- Replace disposable respirators with every use.
- Surgical masks are not to be shared with anyone.
- Avoid touching the surgical mask after wearing it.
- Change surgical mask timely and should be disposed of after use.
- Replace the mask immediately if it is damaged or soiled.



Skin and Body Protection

PPE includes the following categories to protect employees from physical hazards:

Head Protection

PPE includes hard hats and headgears and should be required for tasks that can cause any force or object falling to the head.

Safety Tips:

- Ensure that there are no dents or deformities on the shell and connections are tightened inside.
- Do not store in direct sunlight as extreme heat can cause damage.
- Choose appropriate cleaning agents as it can weaken the shells of hard hats and may eliminate electrical resistance.
- Always replace a hard hat if it was used for any kind of impact, even if the damage is unnoticeable.

Body Protection

PPE includes safety vests and suits that can be used for tasks that can cause body injuries from extreme temperatures, flames and sparks, toxic chemicals, insect bites and radiation.

Safety Tips:

- Ensure that they are clean and free from cuts and burns.
- Always get a good fit to ensure full body protection.
- Ensure bodysuit is heat-resistant clothing when working with high-temperature hazards.

Hands Protection

PPE includes safety gloves and should be used for tasks that can cause hand and skin burns, absorption of harmful substances, cuts, fractures or amputations.

Safety Tips:

- Ensure hand protection fits perfectly with no spaces and is free from cuts, burns and chemical residue.
- Always replace them if any sign of contamination was observed.
- Use rubber gloves when working with heat and electricity to reduce the risk of burn or electrical shock.

Foot Protection

PPE includes knee pads and safety boots and should be used for tasks that can cause serious foot and leg injuries from falling or rolling objects, hot substances, electrical hazards, and slippery surfaces.

Safety Tips:

- Ensure boots have slip-resistant soles that can protect against compression and impact.
- Ensure the sole plate is in good condition to prevent punctures.

Fall Protection

PPE includes safety harnesses and lanyards and should be strictly used for tasks that can cause falling from heights and serious injury or death.

Safety Tips:

- Ensure that the straps are free from tears, deformities and burn marks.
- Check the buckles if connected securely and tightly.
- Dispose of the equipment if used after a falling incident.



Hearing Protection

PPE includes ear muffs and plugs and should be used for tasks that can cause hearing problems and loss of hearing.

Safety Tips:

- Ensure the equipment fit the ear canal perfectly.
- It is recommended to use formable earplugs to fit on different sizes of ear canals.
- Use protectors that reduce noise exposure to an acceptable level to have a room for communication.
- Ensure earplugs are clean and in good condition.

Hearing Protection



Workers exposed to excessive noise should wear proper hearing protection to prevent hearing damage and loss of hearing. Some hearing protection they can use are:

- Single-use earplugs
- Pre-formed or molded earplugs
- Earmuffs

SafetyCulture

PPE Safety Requirements

To promote PPE safety in their workplace, safety officers will need to do the following:

- Check work sites regularly for the need of PPE.
- If PPE is needed, provide employees with properly-fitted PPE.
- Train employees on OSHA PPE standards.
- Provide protective goggles or face shields when there is a danger of flying particles or corrosive materials.
- Require that safety glasses are worn at all times in worksites that pose risk of eye punctures, abrasions, contusions, or burns.
- Provide and require protective gloves in situations where employees could be cut or be possibly exposed to corrosive liquids, chemicals, blood, and other potentially infectious materials.
- Require the use of foot protection when there is risk of foot injury from hot, corrosive, or poisonous substances, and falling objects.
- Inspect hard hats periodically for damage to the shell and suspension system.
- Maintain PPE in sanitary and ready-to-use conditions.
- Ensure that eyewash facilities and quick drench showers are easily accessible for employees when they are accidentally exposed to corrosive materials.
- Establish safe work procedures for disposing of or decontaminating PPE after hazardous exposures

SafetyCulture Marketplace: Your One-Stop Work Gear & Equipment Shop
Improve safety in your workplace with SafetyCulture Marketplace as your one-stop shop for all work gear and equipment needs. Get on-demand access to top quality and specialized work gear from trusted equipment brands in the industry—all in one centralized location. Raise the bar of safety and efficiency by empowering employees to request what they need with just a few taps, anytime and anywhere!

Ensure proper usage of PPE with PPE courses

Providing personal protective equipment (PPE) for your workers alone is not enough to protect them from hazards, injuries, and accidents, especially in industries such as construction, manufacturing, and healthcare. To ensure that their PPE fully serves its function, it's crucial that your workers understand its proper use, maintenance, and disposal to protect themselves (as well as the people they serve, in the case of healthcare workers). Thankfully, training is made easy and convenient for you with the available PPE courses online that your workers can take at their own convenience.

Here, you'll find our highly recommended PPE courses that will cover the different types of PPE and demonstrate when and how to use them properly. Reinforcing PPE training will not only keep your workers safe from hazards but also boost productivity without any threat of unwanted incidents. such as:

- Personal Protective Equipment (PPE) for Manufacturing
- Personal Protective Equipment (PPE) for Construction

PPE Safety Software

SafetyCulture (formerly iAuditor) provides a digital space for safety officers and employees to work towards PPE safety. SafetyCulture helps teams perform hazard assessments to determine if enforcing PPE use is the best control measure for the task. It also allows employees to maintain PPE with ease.

Using the SafetyCulture app, employees can take pictures of PPE defects and even annotate photos to show where the damage is. Tracking the number of usable PPE is easier for safety officers as well and they are better equipped to provide what their employees need to get the job done.

PPE Inspections with SafetyCulture

By using SafetyCulture for PPE inspections, safety officers are able to protect employees from the hazards of the job by ensuring that their PPEs are always in good condition.

With SafetyCulture , conducting regular PPE inspections is easy with convenient access to inspection data automatically stored in the cloud. Safety officers can also generate PPE inspection reports instantly with just one tap, anytime, and anywhere.

Beyond PPE inspections, SafetyCulture can also be used to develop an organization's health and safety program by enabling safety officers to do the following:

- Enforce standardized safety protocols across teams and different sites
- Mitigate risks with a wide variety of free risk assessment templates
- Plan corrective actions immediately to prevent incidents from occurring

Ensuring Safety and Protecting Employees

PPE Safety is the practice of ensuring a safe, working environment for employees and visitors through the use of Personal Protective Equipment (PPE). Safety is paramount to all businesses across industries. Using PPEs, paired with inspections such as workplace and restaurant inspections, assessments like health and safety risk assessments, and analysis such as gap analysis—is essential to protect employees from risks and hazards.

SWOT ANALYSIS

One way to explore these questions is through the use of another device partially borrowed from TQM: SWOT analysis. SWOT stands for Strengths, Weaknesses, Opportunities, and Threats. Each of the questions above can be examined in the light of SWOT analysis. What are the strengths and weaknesses of your organization in regard to each question? What opportunities exist for the organization in each area of its functioning? And what threats or challenges will the organization have to overcome if it is to continue to be successful, and to maintain quality performance?

Strengths and weaknesses: Strengths and weaknesses may be trends, rather than specifics. A level of service that is currently appropriate, for example, is not a strength if it is more or less than will be needed in a year. A new program that's not ready to implement yet is not a weakness if it's unready because the developers are taking the time necessary to make it effective.

By the same token, strengths and weaknesses don't necessarily lie only in the success of programs or the skills of staff members, but in such areas as relationships, contacts, and reputation. An organization running a great program may still be have serious weaknesses because it lacks some of these other features, no matter how well it carries out its day-to-day activities.

Opportunities: Opportunities can take many forms.

- An organization may be able to meet other needs with its current structure. For instance, an organization that publicizes and provides prenatal care to pregnant teens could be in an excellent position to also publicize and provide vaccinations, nutrition information, and help with parenting skills after the babies are born.
- It may be possible to expand into other areas of service, or into a larger arena (another town, another county, national instead of just one state).
- Increased funding may be available from new sources, or because of changed circumstances. A new census, for example, can result in an increase in federal funds to a region, or an economic downturn may bring a demand -- and increased funding -- for adult education or retraining.
- Collaboration with other groups, leading to increased resources, may become a prospect.
- Invitations or awards offered to your organization or staff members or good press may lead to your organization being viewed as more "legitimate."

Taking advantage of any opportunity can have both positive and negative consequences for your organization, so it's important to analyze the situation carefully before committing yourself.

Threats (Challenges): Some of the challenges that go along with any opportunity can be truly daunting if they're not thought through carefully. Many of the opportunities above require some sort of organizational restructuring or growth, processes that are always difficult, and require a lot of planning. Some even represent rethinking the purpose of the organization, which may become a different organization in the process. In becoming larger or more accepted, for instance, an organization may forget its roots or its guiding principles, and lose much of its effectiveness.

Other threats may come unaccompanied by opportunity. Your organization may experience difficulty finding -- and keeping -- ongoing funding and other resources, including competent staff; sustaining continued effort in all areas of functioning (advertising, recruitment, public relations, programming, evaluation, etc.); dealing with controversy; and addressing antagonism from individuals, other groups, or the community.

Applying SWOT analysis to all the areas your organization has to deal with makes it easier both to anticipate and prepare for the negative, and to remember to identify and build on the positiv

THANK YOU

THEORY – 1

ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY

5TH SEMESTER, MECHANICAL ENGINEERING

Prepared by:-

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Chapter – 8

LEGISLATION

TOPIC TO BE COVERED :-

➤ **LEGISLATION**

- **Intellectual Property Rights (IPR), Patents, Trademarks, Copyrights**
- **Features of Factories Act 1948 with Amendment (only salient points)**
- **Features of Payment of Wages Act 1936 (only salient points)**

UNIT-8

LEGISLATION

- a) Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
- b) Features of Factories Act 1948 with Amendment (only salient points)
- c) Features of Payment of Wages Act 1936 (only salient points)

INTELLECTUAL PROPERTY RIGHTS (IP RIGHTS)

Intellectual Property Rights (IP Rights) are like any other property rights which are intangible in nature. The IP Rights usually give the creator an exclusive right over the use of his/her creation for a certain period of time. With the rapid increase in the globalization and opening up of the new vistas in India, the "Intellectual Capital" has become one of the key wealth drivers in the present era. There are different country specific legislations, as well international laws and treaties that govern IP rights.

Every startup has IP Rights, which it needs to understand and protect for excelling in its business. Every startup uses trade name, brand, logo, advertisements, inventions, designs, products, or a website, in which it possesses valuable IP Rights. While starting any venture, the startup also needs to confirm that it is not in violation of the IP Rights of any other person to save itself from unwarranted litigation or legal action which can thwart its business activities. Further, startup ventures should be proactive in developing and protecting their intellectual property for many reasons like improving the valuation of its business, to generate better goodwill, to protect its competitive advantage, to use intellectual property as a marketing edge and to use the IP Rights as a potential revenue stream through licensing.

IP Rights protect several aspects of a business and each type of IP Right carries its own advantages. The scope of IP Rights is very wide, but the prime areas of intellectual property which are of utmost importance for any startup venture are as follows:

- **Trademarks**
- **Patents**
- **Copyrights and Related Rights**
- **Industrial Designs**
- **Trade Secrets**

TRADEMARKS

The Trade Marks Act 1999 ("**TM Act**") provides, inter alia, for registration of marks, filing of multiclass applications, the renewable term of registration of a trademark as ten years as well as recognition of the concept of well-known marks, etc. It is pertinent to note that the letter "R" in a circle i.e. ® with a trademark can only be used after the registration of the trademark under the TM Act.

Trademarks means any words, symbols, logos, slogans, product packaging or design that identify the goods or services from a particular source. As per the definition provided under Section 2 (zb) of the TM Act, "trade mark" means a mark capable of being represented graphically and which is capable of distinguishing the goods or services of one person from those of others and may include shape of goods, their packaging and combination of colors.

The definition of the trademark provided under the TM Act is wide enough to include non-conventional marks like color marks, sound marks, etc. As per the definition provided under Section 2 (m) of the TM Act, "mark" includes a device, brand, heading, label, ticket, name, signature, word, letter, numeral, shape of goods, packaging or combination of colors or any combination thereof.

Accordingly, any mark used by the startup in the trade or business in any form, for distinguishing itself from other, can qualify as trademark. It is quite significant to note that the Indian judiciary has been proactive in the protection of trademarks, and it has extended the protection under the trademarks law

to Domain Names as demonstrated in landmark cases of Tata Sons Ltd v Manu Kosuri & Ors [90 (2001) DLT 659] and Yahoo Inc. v Akash Arora [1999 PTC 201].

Points to Consider While Adopting a Trademark

Any startup needs to be cautious in selecting its trade name, brands, logos, packaging for products, domain names and any other mark which it proposes to use. You must do a proper due diligence before adopting a trademark. The trademarks, can be broadly classified into following five categories:

- a. **Generic**
- b. **Descriptive**
- c. **Suggestive**
- d. **Arbitrary**
- e. **Invented/Coined**

Generic marks means using the name of the product for the product, like "Salt" for salt.

Descriptive marks means the mark describing the characteristic of the products, like using the mark "Fair" for the fairness creams.

Suggestive marks means the mark suggesting the characteristic of the products, like "Habitat" for home furnishings products.

Arbitrary marks means mark which exist in popular vocabulary, but have no logical relationship to the goods or services for which they are used, like "Blackberry" for phones.

The invented/ coined marks means coining a new word which has no dictionary meaning, like "Adidas". The strongest marks, and thus the easiest to protect, are invented or arbitrary marks. The weaker marks are descriptive or suggestive marks which are very hard to protect. The weakest marks are generic marks which can never function as trademarks.

India follows the NICE Classification of Goods and Services for the purpose of registration of trademarks. The NICE Classification groups products into 45 classes (classes 1-34 include goods and classes 35-45 include services). The NICE Classification is recognized in majority of the countries and makes applying for trademarks internationally a streamlined process. Every startup, seeking to trademark a good or service, has to choose from the appropriate classes, out of the 45 classes.

While adopting any mark, the startup should also keep in mind and ensure that the mark is not being used by any other person in India or abroad, especially if the mark is well-known. It is important to note that India recognizes the concept of the "Well-known Trademark" and the principle of "Trans-border Reputation".

Example of well-known trademarks are Google, Tata, Yahoo, Pepsi, Reliance, etc. Further, under the principle of "Trans-border Reputation", India has afforded protection to trademarks like Apple, Gillette, Whirlpool, Volvo, which despite having no physical presence in India, are protected on the basis of their trans-border reputation in India.

Enforcement of Trademark Rights

Trademarks can be protected under the statutory law, i.e., under the TM Act and the common law, i.e., under the remedy of passing off. If a person is using a similar mark for similar or related goods or services or is using a well-known mark, the other person can file a suit against that person for violation of the IP rights irrespective of the fact that the trademark is registered or not.

Registration of a trademark is not a pre-requisite in order to sustain a civil or criminal action against violation of trademarks in India. The prior adoption and use of the trademark is of utmost importance under trademark laws.

The relief which a court may usually grant in a suit for infringement or passing off includes permanent and interim injunction, damages or account of profits, delivery of the infringing goods for destruction and cost of the legal proceedings. It is pertinent to note that infringement of a trademark is also a cognizable offence and criminal proceedings can also be initiated against the infringers.

PATENTS

Patent, in general parlance means, a monopoly given to the inventor on his invention to commercial use and exploit that invention in the market, to the exclusion of other, for a certain period. As per Section 2(1) (j) of the Patents Act, 1970, "invention" includes any new and useful;

- i. **art, process, method or manner of manufacture;**
- ii. **machine, apparatus or other article;**
- iii. **substance produced by manufacture, and includes any new and useful improvement of any of them, and an alleged invention;**

The definition of the word "Invention" in the Patents Act, 1970 includes the new product as well as new process. Therefore, a patent can be applied for the "Product" as well as "Process" which is **new**, involving inventive step and capable of industrial application can be patented in India.

The invention will not be considered new if it has been disclosed to the public in India or anywhere else in the world by a written or oral description or by use or in any other way before the filing date of the patent application. The information appearing in magazines, technical journals, books etc, will also constitute the prior knowledge. If the invention is already a part of the state of the art, a patent cannot be granted. Examples of such disclosure are displaying of products in exhibitions, trade fairs, etc. explaining its working, and similar disclosures in an article or a publication.

It is important to note that any invention which falls into the following categories, is not patentable: (a) frivolous, (b) obvious, (c) contrary to well established natural laws, (d) contrary to law, (e) morality, (f) injurious to public health, (g) a mere discovery of a scientific principle, (h) the formulation of an abstract theory, (i) a mere discovery of any new property or new use for a known substance or process, machine or apparatus, (j) a substance obtained by a mere admixture resulting only in the aggregation of the properties of the components thereof or a process for producing such substance, (k) a mere arrangement or rearrangement or duplication of known devices, (l) a method of agriculture or horticulture, and (m) inventions relating to atomic energy or the inventions which are known or used by any other person, or used or sold to any person in India or outside India. The application for the grant of patent can be made by either the inventor or by the assignee or legal representative of the inventor. In India, the term of the patent is for 20 years. The patent is renewed every year from the date of patent.

Use of Technology or Invention

While using any technology or invention, the startup should check and confirm that it does not violate any patent right of the patentee. If the startup desires to use any patented invention or technology, the startup is required to obtain a license from the patentee.

Enforcement of Patent Rights

It is pertinent to note that the patent infringement proceedings can only be initiated after grant of patent in India but may include a claim retrospectively from the date of publication of the application for grant of the patent. Infringement of a patent consists of the unauthorized making, importing, using,

offering for sale or selling any patented invention within the India. Under the (Indian) Patents Act, 1970 only a civil action can be initiated in a Court of Law. Like trademarks, the relief which a court may usually grant in a suit for infringement of patent includes permanent and interim injunction, damages or account of profits, delivery of the infringing goods for destruction and cost of the legal proceedings.

COPYRIGHT

Copyright means a legal right of an author/artist/originator to commercially exploit his original work which has been expressed in a tangible form and prevents such work from being copied or reproduced without his/their consent.

Under the Copyright Act, 1957, the term "work", in which copyright subsists, includes an artistic work comprising a painting, a sculpture, a drawing (including a diagram, a map, a chart or plan), an engraving, a photograph, a work of architecture or artistic craftsmanship, dramatic work (recitation, choreographic work), literary work (including computer programmes, tables, compilations and computer databases), musical work (including music as well as graphical notations), sound recording and cinematographic film.

In the case of original literary, dramatic, musical and artistic works, the duration of copyright is the lifetime of the author or artist, and 60 years counted from the year following the death of the author and in the case of cinematograph films, sound recordings, posthumous publications, anonymous and pseudonymous publications, works of government and works of international organizations are protected for a period of 60 years which is counted from the year following the date of first publication.

In order to keep pace with the global requirement of harmonization, the Copyright Act, 1957 has brought the copyright law in India in line with the developments in the information technology industry, whether it is in the field of satellite broadcasting or computer software or digital technology.

Registration of Copyright

In India, the registration of copyright is not mandatory as the registration is treated as mere recordal of a fact. The registration does not create or confer any new right and is not a prerequisite for initiating action against infringement. The view has been upheld by the Indian courts in a catena of judgments. Despite the fact that the registration of copyright is not mandatory in India and is protectable through the International Copyright Order, 1999, it is advisable to register the copyright as the copyright registration certificate is accepted as a "proof of ownership" in courts and by police authorities, and acted upon smoothly by them.

Enforcement of Copyright in India

Any person who uses the original work of the other person without obtaining license from the owner, infringes the copyright of the owner. The law of copyright in India not only provides for civil remedies in the form of permanent injunction, damages or accounts of profits, delivery of the infringing material for destruction and cost of the legal proceedings, etc, but also makes instances of infringement of copyright, a cognizable offence punishable with imprisonment for a term which shall not be less than six months but which may extend to three years, with a fine which shall not be less than INR 50,000 but may extend to INR 200,000

For the second and subsequent offences, there are provisions for enhanced fine and punishment under the Copyright Act. The (Indian) Copyright Act, 1957 gives power to the police authorities to register the Complaint (First Information Report, i.e., FIR) and act on its own to arrest the accused, search the premises of the accused and seize the infringing material without any intervention of the court.

INDUSTRIAL DESIGNS

As per the definition given under Section 2(d) of the Designs Act, 2000, "design" means only the features of shape configuration patterns or ornament applied to any article by any industrial process or means whether manual mechanical or chemical separate or combined which in the finished article appeal to and are judged solely by the eye. However, "design" does not include any mode or principle of construction or anything which is in substance a mere mechanical device and does not include any trademark as defined under the TM Act or any artistic work as defined under the Copyright Act, 1957. The total period of validity of registration of an Industrial Design under the (Indian) Designs Act, 2000 is 15 years.

Features of shape, configuration, pattern, ornament or composition of lines or colours applied to any article, whether in two dimensional or three dimensional or in both forms, can be registered under the (Indian) Designs Act, 2000. However, functionality aspects of a design are not protected under the (Indian) Designs Act, 2000, as the same are subject matter of patents.

Design of an article is not registrable in India, if it:

- is not new or original;
- has been disclosed to the public anywhere in India or in any other country by publication in tangible form or by use in any other way prior to the filing date or priority date of the application;
- is not significantly distinguishable from known designs or combination of known designs; or
- comprises or contains scandalous or obscene matter.

Enforcement of Design Rights in India

The (Indian) Designs Act, 2000, only provides for civil remedies. Besides injunction, monetary compensation is recoverable by the proprietor of the design either as contract debt or damages. An action for infringement of design can only be initiated after the registration of the design, however, an action for passing-off is maintainable in case of unregistered design.

TRADE SECRETS

Trade secrets includes any confidential business information which provides an enterprise a competitive edge over others. Trade secrets encompass manufacturing or industrial secrets and commercial secrets, formula, practice, process, design, instrument, pattern, commercial method, or compilation of information which is not generally known or reasonably ascertainable by other.

The unauthorized use of such information by persons other than the holder is regarded as an unfair practice and a violation of the trade secret. There are no specific statutes under the Indian law for the protection of trade secrets and the same are protectable under the common law rights.

STRATEGIES FOR PROTECTION AND EXPLOITATION OF IPR FOR STARTUPS

1. Make Intellectual Property protection a priority:

Start-ups cannot afford the complete protection available under the intellectual property regime. The first step for any startup is to evaluate and prioritize the IP Rights involved in its business. Depending upon the type of industry involved, IP Rights play an important role. Failure to identify or prioritize IP Rights, is likely to create problems for startup's business, especially during negotiations with future investors or exiting its business. Sometimes IP Rights are the only asset available with a startup.

2. Register Intellectual Property Rights:

It is important to note that certain IP Rights like patents and designs are required to be registered before claiming any protection under the respective statutes. On the other hand,

certain IP Rights like trademark and copyright need not be mandatorily registered for protection under. Nevertheless, a registered IP Right carries a greater value and acts as evidence of use of the IP Rights before courts as well as enforcement agencies;

3. **Due Diligence of IP Rights:**

For any startup, it is indispensable that it does not violate IP Rights of any other person. This will ensure safety from unwarranted litigation or legal action which can thwart its business activities. This makes it even more important for startups to make careful IP decisions in the initial phase and conduct proper due diligence of IP Rights, which it is using or intends to use.

4. **Implement clear and effective policies and strategies for protection of IP Rights:**

It is in the long term interest of startups to have an Intellectual Property Policy for management of various IP rights which may be presently owned, created or acquired in future by startups. The aim of such a policy is to ensure that there are no inter-se dispute between the promoters of the startups, which remains till date to be one of the main concerns for failure of startups.

5. **Agreements related to Intellectual Property:**

It is pertinent to note that having proper documentation in the form of agreements like non-disclosure agreements, agreements with employees or independent contractors, can make all the difference between the success and failure of startups. Usually, intellectual property is created either by the founders or some key employee or a third party. The intellectual property so created, must be protected through a proper agreement between the founder or key employee or a third party, as the case may be and the startup. If the agreement, with founders or employees or a third party, under which a novel idea was/is created, is overlooked, it could create bottlenecks later after such idea becomes successful. Accordingly, the startups need to ensure that anything created on behalf of the startup, belongs to the startup and not the Employee or a third party. Further, it is advisable to enter into elaborate assignments, licensing or user agreements, and care should be taken to make provisions for all post termination IP Right issues.

What is intellectual property and what is intellectual property rights?

The World Intellectual Property Organisation defines intellectual property as creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce.

In simple terms, anything that you create by applying your mind or intellect becomes your intellectual property. For example, you are setting up a business of your own and have designed a logo for your brand. That logo is your intellectual property. Similarly a scientific invention is also an intellectual property.

When you create a logo for your brand, you will want it to be unique and resonate with your brand. You want to stand out from your competitors and also make sure your ideas are not copied or misused. This is where intellectual property rights come in.

Intellectual property rights are given to creators for a specific amount of time. During this time the creator is protected from infringement and can license their product for manufacturing in return for a royalty.

The legal rights provided to the creator or inventor of intellectual property are known as intellectual property rights. Every creator enjoys certain privileges provided by the law that protects the creators from infringement or misuse of their work without their explicit permission. Intellectual property rights also aid creators in putting their work to use for the general public by allowing for commercial licencing.

Intellectual property rights are granted to creators for a limited period of time.

What are the types of intellectual property?

As mentioned earlier, intellectual property is an umbrella term used to describe creations of the human mind. For the purpose of intellectual property rights protection, IP can be categorised as the following:

1. **Trademarks:** This refers to any symbols, logos signs, words and/ or sounds that are unique to a product or business. For example, the trademark blue bird logo for Twitter is its representative of its brand and is protected by intellectual property rights.
2. **Copyrights:** This is applicable to any published work such as books, art work, songs, web content and films, among others. Your favourite cartoon duo Tom and Jerry are artwork copyrighted by Disney.
3. **Patents:** Any new invention that holds the potential being put to commercial use is protected from infringement or duplication by a patent. Recently, pharma major Cipla lost a patent battle to Amgen Inc over the injectable cancer drug Kyprolis.
4. **Industrial designs:** These are features such as shape, pattern, ornament or composition applied to a product by an industrial process such as by chemical process or mechanical process.
5. **Geographical indicators:** A name or sign used on certain products that marks the identity of a particular geographical location or origin is termed as a geographical indicator. For example, West Bengal holds the geographical indicator tag for its beloved Rosogolla.

Indian laws to protect intellectual property

In India, intellectual property rights are protected by a host of laws and rules issued by the government from time to time. Primarily, intellectual property rights are protected by the following legislation and rules:

1. Trade Marks Act, 1999 and Trade Marks Rules of 2002 and 2017. Your beloved mango drink Maaza was embroiled in a trademark controversy when Coca Cola claimed infringement of trademark over Bisleri. Originally a drink by Bisleri, the trademarks for the drink was sold to Coca Cola by Bisleri. However, in 2008, Bisleri filed for registering the trademark for Maaza in Turkey, which was then contested by Coca Cola
2. The Patents Act, 1970 (as amended in 2005), 2003 Patent Rules and 2016 Patent Amendment Rules
3. The Copyright Act, 1957. The most notable case under this Act was the Tips vs Wynk music fallout. Tips Industries and streaming platform Wynk had entered an agreement where the latter was granted a licence to access the large music database of Tips. At the end of this agreement, amid negotiations for extending the agreement, Tips alleged that Wynk was infringing on its IP. The judgement was in favour of Tips Industries.
4. The Designs Act, 2000, and Designs Rules, 2001
5. The Geographical Indications of Goods (Registration and Protection) Act, 1999
6. The Semiconductor Integrated Circuits Layout Design Act, 2000
7. The Protection of Plant Varieties and Farmers' Right Act, 2001

While these laws provide domestic protection to intellectual property rights, India has also signed agreements with various countries for safeguarding intellectual property.

How to protect your intellectual property in India

The intellectual property laws in the country are designed to support innovation and research. In order to reap the benefits of intellectual property rights in the country, the first step is to register your creation. You can register your intellectual property for patents, trademarks or copyrights. In case of an infringement, you can challenge the same as civil disputes in the court of law.

Advantages of intellectual property rights

Here's why it is important to look after intellectual property rights:

1. **Ownership:** In a competitive world, entrepreneurs, businesses and researchers are constantly trying to outdo each other. A determining factor to win in this competition is ownership of the creation. Intellectual property rights ensure that the creator holds the sole authority over their creation.
2. **Infringement:** With intellectual property rights, creators are protected against any competitor illegally contravening on the creation. For example, an entrepreneur's scientific invention is their own. They are the sole owner of the creation and can choose to do what they wish with it. Anybody using the scientific invention for any purpose without paying due credit or royalty to the creator is liable to face legal action.
3. **Commercialisation:** Intellectual property rights are of great importance when a creator wishes to commercialise their product. It paves the way for the creator to issue a licence for mass production of the product in exchange for monetary benefits and royalty.
4. **Learning:** While registering a new intellectual property, the creator has to reveal details of the product to the general public. This practice encourages a culture of sharing of information that can be used for further development by contemporaries in the field.

Final note: Intellectual property rights are important drivers of the economic growth of a country. For inventors and entrepreneurs, who are constantly competing with each other to stand out in the market, intellectual property rights are essential.

In India, intellectual property rights safeguard the interests of the inventor. You can bring civil or criminal cases against competitors to enforce your intellectual property rights, depending on the infringement or violation.

There are only three ways to protect intellectual property in the United States: through the use patents, trademarks or copyrights. A patent applies to a specific product design; a trademark to a name, phrase or symbol; and a copyright to a written document. All three methods have limitations--there's no one perfect way to protect an idea.

Copyright Protection

A copyright will protect the following categories of works:

- literary works
- musical works, including any accompanying words
- dramatic works, including any accompanying music
- pantomimes and choreographic works
- pictorial, graphic and sculptural works
- motion pictures and other audiovisual works
- sound recordings
- architectural works
- computer programs (sometimes the graphical user interface) and websites

Copyright protection gives the copyright holder the exclusive right to copy the work, modify it (that is, create "derivative works"), and distribute, perform and display the work publicly.

Ideas or concepts do not have copyright protection. Copyright protects the expression of the idea, but not the ideas themselves. For example, if I ask you what a chair is, you get a picture in your head; the

picture I get in my head is different from the picture you get in your head and probably also different from the picture Buffy gets in her head. These are the "ideas" of what a chair is. However, if you were to draw the chair you envisioned in your head or use words to describe that chair, it's an "expression" of the idea--and that's what's protected by copyright.

Generally, the only protection for ideas and concepts is through trade secret law and/or confidentiality agreements, which provide a contractual remedy for misuse or disclosure of the idea.

Patents

Patents protect processes, methods and inventions that are "novel," "non-obvious" and "useful." If granted, a patent gives you a 20-year monopoly on selling, using, making or importing an invention into the United States. The requirements for a patent are complex, but here they are in a nutshell:

- **Your work must be novel.** This means it must not be known or used by others in this country, or patented or described in a printed publication here or abroad, or in public use or for sale in this country more than one year prior to the application for patent.
- **Your work must be non-obvious.** This means it must not be obvious to a person having ordinary skill in the pertinent art as it existed when the invention was made.
- **Your work must be useful.** This means that it must have current, significant, beneficial use as process, machine, manufacture, composition of matter or improvements to one of these. According to the Patent Office: "The word 'process' is defined by law as a process, act or method, and primarily includes industrial or technical processes. The term 'machine' used in the statute needs no explanation. The term 'manufacture' refers to articles that are made, and includes all manufactured articles. The term 'composition of matter' relates to chemical compositions and may include mixtures of ingredients as well as new chemical compounds. These classes of subject matter taken together include practically everything which is made by man and the processes for making the products."

Patent protection requires full public disclosure of the work in detail and therefore precludes maintaining any trade secret protection in the same work.

Trademarks

A trademark is like a brand name. It is any word(s) or symbol(s) that represent a product to identify and distinguish it from other products in the marketplace. A trademark word example would be "Rollerblades." A trademark symbol would be the peacock used by NBC.

A trademark can be registered in three ways:

1. By filing a "use" application after the mark has been used.
2. By filing an "intent to use" application if the mark has not yet been used.
3. In certain circumstances in which a foreign application exists, you can rely on that.

The (TM) mark may be used immediately next to your mark. The ® registration symbol may only be used when the mark is registered with the PTO. It is unlawful to use this symbol with your mark before receiving an issued registration from the PTO.

What qualities make for a strong trademark? The cardinal rule is that a mark must be distinctive. The more distinctive it is, the easier your trademark will be to enforce. This is why so many trademarked products have unique spellings.

Trademark rights last indefinitely if the company continues to use the mark to identify its goods or services. When the mark is no longer being used, the registration is terminated. The initial term of federal trademark registration is 10 years, with 10-year renewal terms.

Trade Secrets

There is a great deal of confusion regarding trade secrets. Many people think that a trade secret is some type of protection provided by the government that allows them to seek recourse in court should someone infringe upon their idea. However, unlike copyrights, trademarks and patents, a trade secret is not registered with any government office to provide a verifiable public record of any claims to the secret. You can, however, declare one to a patent lawyer in a notarized and signed disclosure. In this manner the trade secret belongs to you forever--or until someone leaks it.

Trade secrets refer to items such as recipes that are unique and provide a business with a competitive advantage, but which cannot be safeguarded under current forms of idea protection such as copyright, trademark or patent. The best form of protection for these items is to keep them a secret. One of the most famous and best-kept trade secrets is the formula for Coca-Cola.

The best way to secure the information for a trade secret is to restrict access to the secret and have individuals and companies sign nondisclosure agreements with you should you enter into a relationship with them which will require them to know some aspects of the secret. If someone independently develops or reverse-engineers your trade secret, there's nothing you can do. If someone does leak it, you can sue for theft. Suing, however, cannot stop the person from using the leaked information. So although you may get money from the suit, you lose the larger potential profits you could have made from the idea. Still, if your luck holds and your trade secret remains secret, royalty income from it can last significantly longer than the patent period.

FEATURES OF FACTORY ACT 1948

Introduction

The Factories Act of 1948 was enacted to protect the welfare of workers in a factory by regulating employment conditions, working conditions, the working environment, and other welfare requirements of specific industries. The Court held in *Ravi Shankar Sharma v. State of Rajasthan* (1993) that the Factory Act is social legislation that covers the health, safety, welfare, and other aspects of factory workers. The Factories Act lays out guidelines and safety measures for using machinery, and with its strict compliance, it also provides owners with instructions. When factory workers were taken advantage of and exploited by paying them low wages, the Factories Act was passed.

A factory is a building or group of buildings where people work with machinery to make goods. The primary goal of the Factories Act is to safeguard employees in a factory from industrial and occupational risks. This Act gives the owner or occupier of a factory a particular responsibility to secure and protect employees from employment in conditions harmful to their health and safety in order to safeguard workers. It is stated in the Act that the purpose of the Factories Act is to amend and consolidate the legal framework governing factory labour. The Bhopal gas tragedy case (1984) raised public awareness of factory pollution and risks, necessitating government action to allow legislation amendments.

Salient features of Factories Act, 1948 with Amendment-

The important features of the 1948 Act are as follows:

- The word “factory” has been expanded by the Factories (Amendment) Act of 1976 to include contract labour when determining whether a factory has a maximum of 10 or 20 employees.
- The Act increased the minimum age for children to work in workplaces from 12 to 14 and reduced their daily working hours from 5 to 4 and a half.
- The Act forbids women and children from working in factories from 7 p.m. to 6 a.m.
- The difference between a seasonal and non-seasonal factory has been abolished by the Act.
- The Act, which has provisions for factory registration and licencing.
- The state government is required to make sure that all factories are registered and also have valid licences that are renewed from time to time.
- The Act gives state governments the authority to enact rules and regulations that ask for management and employee association for the benefit of employees.
- The state government has the authority to apply the Act’s requirements to any establishment, regardless of the number of employees inside and regardless of whether the establishment engages in manufacturing operations.
- In *Rabindra Agarwal v. State of Jharkhand* (2010), the Jharkhand High Court held that the Factories Act, special legislation would prevail over the Indian Penal Code

Objectives of Factories Act, 1948

- The major goal of the Factories Act of 1948 is to establish adequate safety measures and to enhance the health and welfare of workers employed in a factory. The Act also protects workers from various industrial and occupational hazards.
 - **Health:** According to the Act, all factories must be kept clean, and all essential safeguards must be taken to safeguard the health of workers. The factory must have a sufficient drainage system, adequate lighting, ventilation, temperature, etc. There must be clean water supplies. Separate restrooms and urinals must be built in convenient locations for males and females. These must be freely accessible to employees and kept clean.
 - **Safety:** The Act requires that machines be properly fenced; that no young adults work on any dangerous machines in enclosed places, and also that appropriate manholes be provided so that employees may escape in an emergency.
 - **Welfare:** The Act specifies that appropriate and suitable washing facilities for workers must be provided and maintained in every factory. There must be storage and drying facilities, as well as sitting areas, first-aid equipment, shelters, restrooms and lunch rooms.
- The Act also imposes some restrictions on the employment of women, small children, and teenagers, such as working hours, intervals, holidays, etc., as well as on annual leave with pay, etc.
 - **Working hours:** The Act sets working hours for all workers, and no adult worker must be permitted to work in a workplace for more than 48 hours per week. Weekly holidays need to be granted.
- The Act also imposes specific restrictions on owners, occupiers, or the manufacturer’s head in order to safeguard employees and ensure their health and safety precautions.
- The Act protects workers from exploitation and improves working conditions and the environment within factory premises.
 - **Penalties:** The Act also specifies specific rules created with provisions under the Act, and written orders that are violated. It is an offence, and penalties will be imposed, imprisonment for up to a year; a fine of up to one lakh rupees; or both fine and

imprisonment. Any employee who misuses equipment related to the welfare, safety, and health of other employees, or those connected to the performance of his duties, suffers a Rs.500 fine.

What is “Wages”?

Wage is monetary compensation or remuneration, personnel expenses, of the labor paid by an employer to the employees in exchange for work done. Wage may be calculated as a fixed amount for each task completed or at an hourly / daily rate / based on an easily measured quantity of work done.

Wages include all remunerations which are expressed in terms of money and **“includes”** the following:

- Amount payable under the terms of employment
- Payable under any award / settlement or order of a Court
- Paid as Overtime work or for holidays / leave period
- Payable on account of Termination of employment”

Wages does **“not include”** the following Payments:

- Bonus which does not form a part of remuneration
- Value of any house accommodation, supply of light, water, medical assistance etc.
- Any traveling concession
- Contribution payable by employer to any pension or provident fund
- Any sum paid to defray special expenses incurred as requirement of the Employment
- Gratuity payable on termination of employment

Objectives:

- Regulate payment of wages to specific class of workers employed in industry without any wrongful deductions apart from what is mentioned in the Act
- Define regulations around fixing of wage period, time and mode of payment of wages
- Regulates the rights of the workers covered under this Act

Applicability:

This Act is applicable to all persons employed, whether directly or through contractors, in a factory or certain specified industrial or other establishments.

- The Central Government is responsible for enforcement of the Act in Railways, Mines, Oilfields and air transport services.
- The State Government are responsible for it all other establishment (factories and other establishments)
- The Act does not cover those whose wage is Rs. 24,000/- or more per month

Salient Features of the Act:

A. Obligations of Employers:

Every employer is responsible for the payment of wages to all the employees that he employs. Additionally, apart from the Employer, all the person so named / person so responsible to the employer / the person so nominated shall also be responsible for such payment.

B. Wage Period:

Every person responsible for Wage Payment shall fix periods in respect of which such wages shall be payable. No wage-period shall exceed one month.

C. Time and Mode of Payment of Wages:

Every establishment having employees in excess of 1,000 person shall pay the wages before the expiry of the 10th day. All other employers shall make the Wage payment by the expiry of 07th day.

Employers shall make the payment of wages in current currency notes i.e. cash or via Bank transfer.

D. Deductions from Wages:

Employers shall ensure that wages are paid to all employees without deduction of any kind except those authorized by or under this Act.

Deduction includes the reduction of wages for the following:

- Fines
- Absence from duty
- Damage to or loss of goods including loss of money where such damage or loss is directly attributable to employee's neglect or default
- Recovery of advances / loans and the interest due in respect thereof
- Adjustment of over-payments of wages
- Payments made by the employed person to the employer or his agent shall also be deemed to be a deduction from wages.

Deductions **does not include** following penalties (provided the rules w.r.t. penalty are in conformity with the requirements as specified by the State Government):

- Withholding of increment or promotion
- Reduction to a lower post
- Suspension

A. Compliance Requirements:

Maintenance of Registers:

Employers shall maintain Registers and records giving the following details:

- Particulars of persons employed
- Work performed by Employees
- Wages paid to employees and deductions made from their wages

All these Registers are required to be preserved for a period of 03 Years.

Display of Notice of Abstracts:

All Employers shall display Notice containing such abstracts of this Act and of the rules made thereunder in English and in the language of the majority of the persons employed in the factory. It includes the following:

- List of acts and omissions approved under Rule 12
- Rates of wages payable to employees (excluding those in supervisor / manager positions).

A. Penalties for Offences under the Act:

If Employers fails to maintain registers required under this act or wilfully refuses to furnish such information or return or wilfully furnishes false information shall be punishable with fine up to Rs. 1,500 and may extend to Rs. 7,500.

Additionally, If Employers fails to pay the wages by the date fixed by the authority shall be punishable with an additional fine which may extend to Rs. 750 / Day.

B. Un-disbursed Wages in event of Death of an Employee:

In case the Wages cannot be paid on account death of an employee or non-availability of details of his / her whereabouts, such amounts is required to be paid to person nominated by him in this behalf. In case employee has not nominated anyone, such amount shall be deposited with the prescribed authority.

THEORY – 1

ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY

5TH SEMESTER, MECHANICAL ENGINEERING

Prepared by:-

**SAROJ KUMAR SAHU
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SMART TECHNOLOGY

TOPIC TO BE COVERED :-

➤ SMART_TECHNOLOGY

- Intellectual Property Rights (IPR), Patents, Trademarks, Copyrights
- Features of Factories Act 1948 with Amendment (only salient points)
- Features of Payment of Wages Act 1936 (only salient points)

SMART TECHNOLOGY

- **Concept of IOT, How IOT works**
- **Components of IOT, Characteristics of IOT, Categories of IOT**
- **Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.**

The Internet of Things (IoT) describes the network of physical objects—“things”—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.

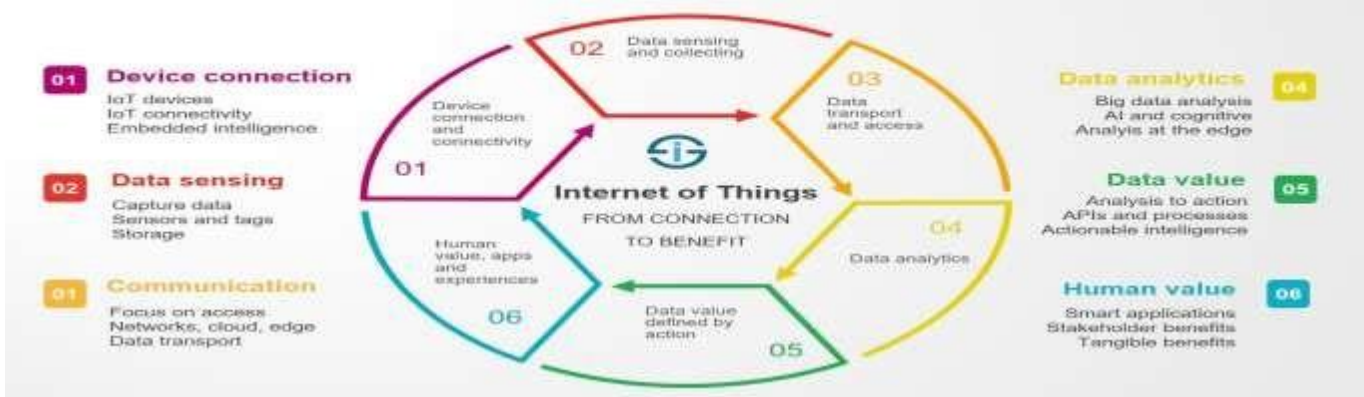
“The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.”

Internet of Things :

According to the definition of IoT, It is the way to interconnection with the help of the internet devices that can be embedded to implement the functionality in everyday objects by enabling them to send and receive data. Today data is everything and everywhere. Hence, IoT can also be defined as the analysis of the data generate a meaning action, triggered subsequently after the interchange of data. IoT can be used to build applications for agriculture, assets tracking, energy sector, safety and security sector, defense, embedded applications, education, waste management, healthcare product, telemedicine, smart city applications, etc.

The Internet of Things

From connecting devices to human value



However, all complete IoT systems are the same in that they represent the integration of four distinct components: sensors/devices, connectivity, data processing, and a user interface.

How an IoT System Actually Works

As you saw in the previous chapter, the applications for IoT extend across a broad variety of use cases and verticals. However, all complete IoT systems are the same in that they represent the integration of four distinct components: sensors/devices, connectivity, data processing, and a user interface.

We'll outline what each one means in the sections below and how they come together to form a complete IoT system. Each of these sections will also serve as the organizational structure of the rest of this ebook, and we'll dive into these components more deeply in the chapters to follow.

1) Sensors/Devices

First, sensors or devices collect data from their environment. This data could be as simple as a temperature reading or as complex as a full video feed.

We use "sensors/devices," because multiple sensors can be bundled together or sensors can be part of a device that does more than just sense things. For example, your phone is a device that has multiple sensors (camera, accelerometer, GPS, etc), but your phone is not just a sensor since it can also perform many actions.

However, whether it's a standalone sensor or a full device, in this first step data is being collected from the environment by *something*.

2) Connectivity

Next, that data is sent to the cloud, but it needs a way to get there!

The sensors/devices can be connected to the cloud through a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), connecting via a gateway/router or connecting directly to the internet via ethernet (don't worry, we'll explain more about what these all mean in our connectivity section).

Each option has tradeoffs between power consumption, range, and bandwidth. Choosing which connectivity option is best comes down to the specific IoT application, but they all accomplish the same task: getting data to the cloud.

3) Data Processing

Once the data gets to the cloud (we'll cover what the cloud means in our data processing section), software performs some kind of processing on it.

This could be very simple, such as checking that the temperature reading is within an acceptable range. Or it could also be very complex, such as using computer vision on video to identify objects (such as intruders on a property).

But what happens when the temperature is too high or if there is an intruder on property? That's where the user comes in.

4) User Interface

Next, the information is made useful to the end-user in some way. This could be via an alert to the user (email, text, notification, etc). For example, a text alert when the temperature is too high in the company's cold storage.

A user might have an interface that allows them to proactively check in on the system. For example, a user might want to check the video feeds on various properties via a phone app or a web browser.

However, it's not always a one-way street. Depending on the IoT application, the user may also be able to perform an action and affect the system. For example, the user might remotely adjust the temperature in the cold storage via an app on their phone.

And some actions are performed automatically. Rather than waiting for you to adjust the temperature, the system could do it automatically via predefined rules. Rather than just call you to alert you of an intruder, the IoT system could also automatically notify security teams or relevant authorities.

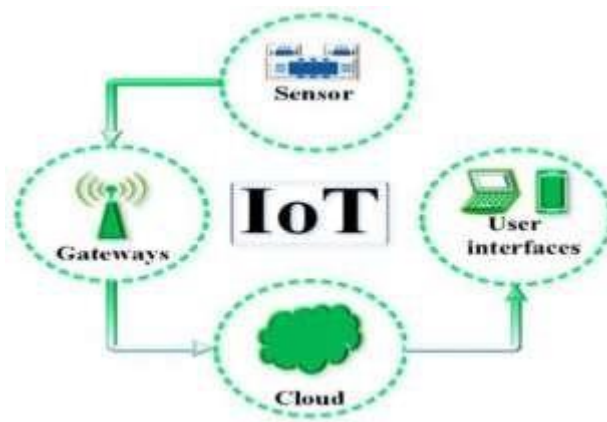
Modern technology offers much interactive design to ease complex tasks into simple touch panels controls. Multicolor touch panels have replaced hard switches in our household appliances and the trend is increasing for almost every smart home devices.

User interface design has higher significance in today's competitive market, it often determines the user whether to choose a particular device or appliance. Users will be interested to buy new devices or smart gadgets if it is very user friendly and compatible with common wireless standards.

Components of IoT

The basic three components of IoT includes "Things", "Internet", and "Connectivity".

<u>IoT Components</u>	<u>Description</u>	<u>Example</u>
Things	Physical objects	
		Sensors
	Autuators	It affect the physical environment e.g. Brake controller of car
Internet	Platforms	Type of middleware used to connect IoT components (objects, people, services, etc) to IoT. Provide numerous functions:
		· Access to devices
		· Ensuring proper installation/behavior of device
		· Data analytics
		· Interoperable connection to local network, cloud or other devices.
	Services	e.g. Cloud services can be used to:
		· Process big data and turn it into valuable information
		· Build and run innovative applications
		· Optimize business processes by integrating device data
Connectivity	Network	IoT components are tied together by networks, using various wireless and wireline technologies, standards, and protocols to provide pervasive connectivity.
		· RFID



CHARACTERISTICS OF THE INTERNET OF THINGS :

There are the following characteristics of IoT as follows.

1. Connectivity is an important requirement of the IoT infrastructure. Things of IoT should be connected to the IoT infrastructure. Anyone, anywhere, anytime connectivity should be guaranteed at all times. Without connection, nothing makes sense.

2. Intelligence and Identity –

The extraction of knowledge from the generated data is very important. For example, a sensor generates data, but that data will only be useful if it is interpreted properly. Each IoT device has a unique identity. This identification is helpful in tracking the equipment and at times for querying its status.

3. Enormous Scalability –

The number of elements connected to the IoT zone is increasing day by day. Hence, an IoT setup should be capable of handling the massive expansion. The data generated as an outcome is enormous, and it should be handled appropriately.

4. Dynamic and Self-Adapting (Complexity) –

IoT devices should dynamically adapt themselves to the changing contexts and scenarios. Assume a camera meant for the surveillance. It should be adaptable to work in different conditions and different light situations (morning, afternoon, night).

5. Architecture

IoT architecture cannot be homogeneous in nature. It should be hybrid, supporting different manufacturers' products to function in the IoT network. IoT is not owned by anyone engineering branch. IoT is a reality when multiple domains come together.

6. Safety

There is a danger of the sensitive personal details of the users getting compromised when all his/her devices are connected to the internet. This can cause a loss to the user. Hence, data security is the major challenge. Besides, the equipment involved is huge. IoT networks may also be at the risk. Therefore, equipment safety is also critical.

Applications of IoT:

Before going to read about IoT applications, just watch this reference video-

<https://youtu.be/91aXs9E0qAI>

The concept of the Internet of Things entered our lives in 1999. However, in fact, the first IoT application has entered our lives before. In 1991, a system was designed to send images of the coffee machine to the computers of academics at the University of Cambridge three times a minute. Due to the fact that it is online and in real time, this system is considered to be the first application of the Internet of Things in the world. Some of the applications are-

1. Wearables
2. Connected cars/smart cars
3. Smart cities
4. Smart industries
5. Smart agriculture
6. Smart retail
7. Energy management
8. Smart healthcare
9. Smart poultry and farming
10. Smart dust

Smart City IoT Applications



Smart city IoT applications aim to ensure that citizens live in maximum comfort and resource consumption is made wisely. It aims to reduce and ultimately eliminate traffic density, air pollution, polluted water resources, garbage and waste problems, population agglomeration, and crime rates. In short, the goal of smart city IoT applications is basically to put an end to all problems that endanger human safety, health and well-being. Smart cities that solve the traffic problem with smart traffic lights or end the dirty water problem with clean water projects get very efficient results.

Smart Farming IoT Applications

IoT in Smart Farming



Smart Farming IoT Applications

To understand **smart farming IoT applications**, first, let's define the concept of smart farming. Combining many advanced technologies and using them in agriculture is called smart farming. Smart farming and smart agriculture use modern informatics methods in agriculture and aim to increase productivity. Thanks to smart agriculture, the life of both producers and farmers is much easier.

Thanks to **IoT applications in agriculture**, control of agricultural areas can be done remotely. This saves time for everyone working in the agricultural sector. The simultaneous operation of agricultural machinery is one of the factors that save time and speed.

The use of **IoT based applications in agriculture** is also an action aimed at protecting the environment. With the spread of smart farming practices all over the world, it is aimed to prevent problems such as water scarcity and drought in time.

It is aimed to reduce the chemical products used in agriculture and thus to produce healthier products. Thus, the cost of such chemical products will be eliminated and savings will be provided.

IoT based applications in agriculture, which ensure that each natural resource is used only in the required amount, aim to avoid waste.

Smart Grids IoT Applications

SMART GRID & IOT



It is aimed to establish mutual electronic communication between the supplier and the consumer through smart grids. Smart grids **IoT and its applications** work intertwined with each other. Smart grids IoT applications are encountered in many fields especially in the energy systems. It is aimed to add smart meters and monitoring systems to the electricity networks and thus to monitor a more reliable, quality and safe process.

Smart Home IoT Applications



IoT applications used in smart homes and smart buildings are used to control the systems inside these buildings and homes. It provides control of systems that provide lighting, heating, security, alarm, entertainment systems and so on.

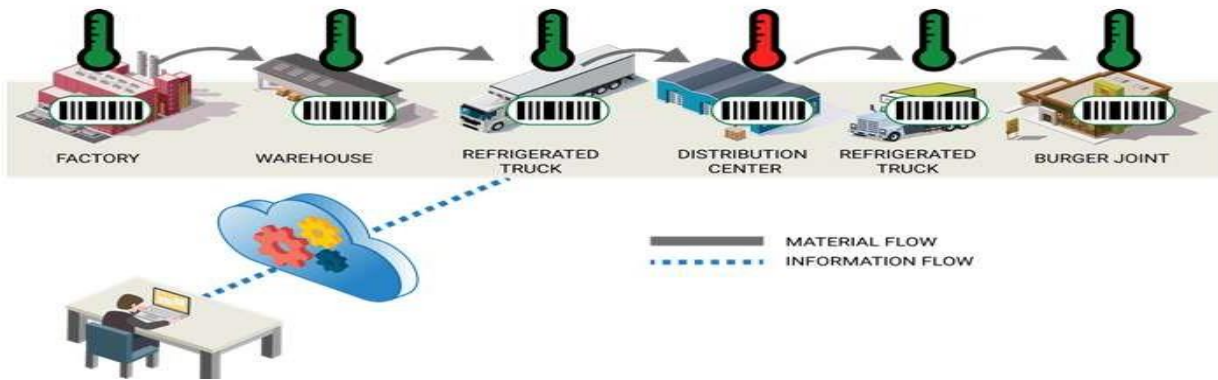
Smart Retail IoT Applications



Internet of Things technology develops IoT applications to improve in-store customer experience and provide a higher quality service. It brings customers, objects, sales processes and transactions to the digital platform.

Smart Supply Chain IoT Applications

IoT Solutions are set to Revolutionize Supply Chain Revenue Opportunities



One of the areas that IoT technology has entered into the digitalization process is the smart supply chain IoT applications. IoT technology is able to control the complexity caused by the increasing number of data and the increasing number of complex variables on a global scale.

Wearables IoT Applications



Wearable **IoT applications** are mainly used in the health and fitness sectors. Thanks to the wearable devices manufactured with IoT technology, it is possible to make measurements of people's body, disease follow-up and many other measurements at any time. The number of wearables IoT applications that are causing serious and positive changes especially in the health sector is increasing day by day.

Connected Car IoT Applications



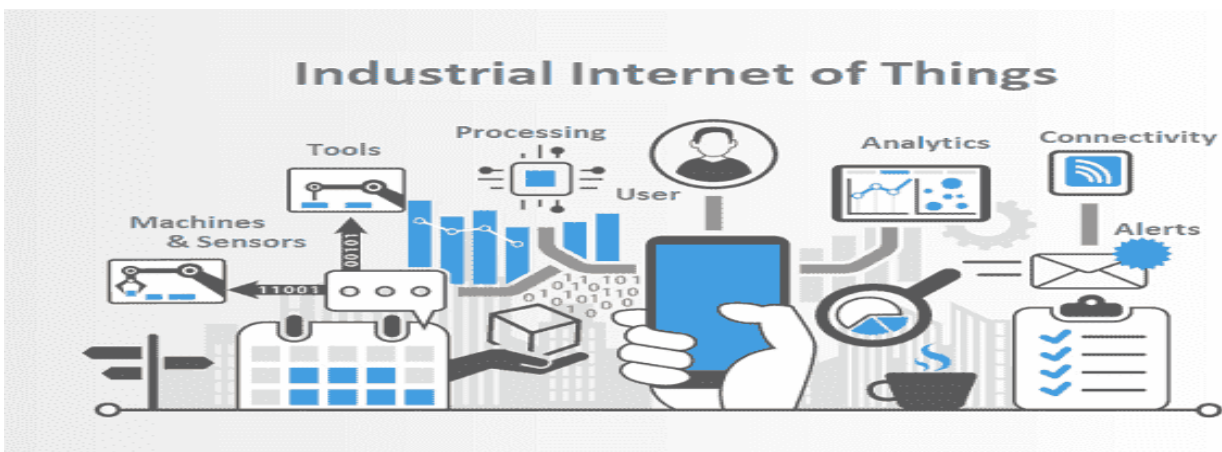
Connected car **IoT based applications** used in transportation have resulted in many solutions such as smart traffic control, unmanned autonomous navigation, smart parking systems, and the establishment of digital communication between the vehicle and the driver.

Connected Health IoT Applications



Connected health **IoT applications ideas** in health and fitness have contributed greatly to the development of mobile digital medical systems. Many opportunities such as remote monitoring of patients' health status, emergency notification systems, wearable IoT devices and monitoring of patients' body values have been realized thanks to the ideas of health and fitness IoT applications.

Industrial Internet IoT Applications



Industrial IoT applications, aka IIoT Applications, are a set of applications that fundamentally restructure the industry. Therefore, these developments in technology are also called as a new industrial revolution. It is a system where all the smart devices used in production or other industrial fields can communicate with each other and control this communication from a single device.

Industrial IoT applications can be seen in many areas. Frequently used in industrial automation, smart robot systems, smart sensors, wearable technology integration, logistics, software, security, energy management.

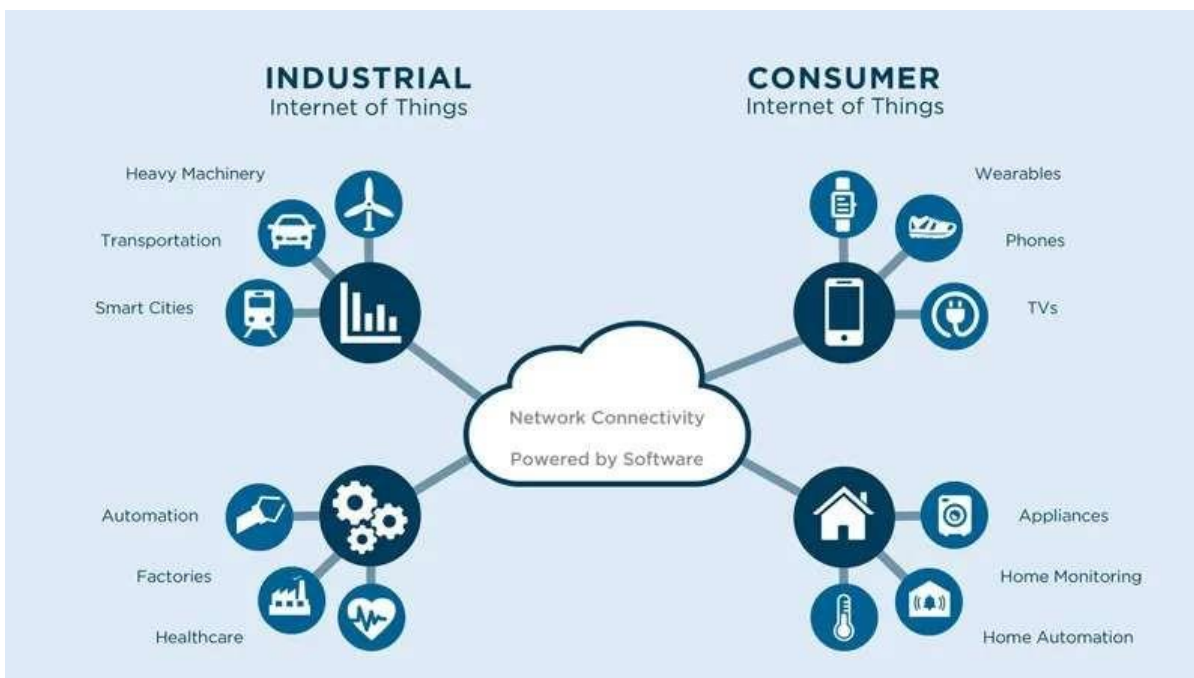
IOT CATEGORIES

Defining IoT with a consumer part and an industrial/business segment

The first distinction people started to make was between a consumer IoT and an Internet of Things for industrial applications or Industrial IoT as a way to distinguish between many types of IoT use cases and applications. Yet, as said and as with all terminology there were certainly overlaps in the definitions of these forms of IoT.

This is why some organizations and individuals, for instance, rather talk about the Internet of Everything, while others opt to drop the term IoT altogether and mention it in terms of specific use cases and contexts such as smart cities, smart metering, smart buildings, smart office, smart wearables, Industrial Internet or smart homes, all of course with their own meaning and, again, with more subdivisions.

Consumer IoT (CIoT)



The Consumer Internet of Things or CIoT is where you will find applications and use cases to track your personal 'assets' (*asset tracking*), from your pet to your skateboard. Or where you will find the connected 'smart appliances' such as connected refrigerators, washing machines, light bulbs, etc.

Also wearables for consumer use (wearables are also used in healthcare and in factories, to name just two) and all sorts of consumer electronics such as smart wristwear belong to this category, along with all sorts of smart home appliances like thermostats or connected parking door openers.

The applications get better and smarter. They also get more independent from other devices such as smartphones. This is certainly the case with smart wearables.

A simple definition of the Consumer Internet of Things is all we need: the Internet of Things as it's used for consumer applications and consumer-oriented services.

What is Consumer Internet of Things (CIoT)?

Consumer IoT (CIoT) refers to the use of IoT for consumer applications and devices. Common CIoT products include smartphones, wearables, smart assistants, home appliances, etc.

Typically, CIoT solutions leverage Wi-Fi, Bluetooth, and ZigBee to facilitate connectivity. These technologies offer short-range communication suitable for deployments in smaller venues, such as homes and offices.

Typically, in Consumer IoT, data volumes and data communication needs are low and limited. That's why there are many technologies of which some are specifically designed for consumer applications, ranging from smart home connectivity standards to special operating systems for wearables.

IIoT (Industry 4.0)

The Industrial Internet of Things or IIoT describes typical industry use cases across a range of sectors. Two examples of Industrial IoT use cases: predictive maintenance and asset management. Some people see the Industrial Internet of Things more in a context of 'heavy' industries like manufacturing or utilities. But it is also used for use cases in, for example smart cities.

If we look at it as a sort of 'Business Internet of Things' it is clear that there are some overlaps with the Consumer Internet of Things. For instance: if you have a smart thermostat and smart energy consumption meter in your house they are on one hand consumer applications because they are for personal usage.

But from the perspective of the company that uses it to send you invoices and to help optimize energy consumption it is a business matter (e.g., 'smart grid'). So, the terms are not that good but that's how it is and it's better to look at use cases than at these broad categories because just as there are many different applications in the Consumer Internet of Things, there are also many in IIoT and some are hard to compare. Most industrial IoT applications relate to the digital transformation of manufacturing or to the rise of smart industry though.

IoT Enablers and connectivity layers

IoT Enablers:

- **RFIDs:** uses radio waves in order to electronically track the tags attached to each physical object.
- **Sensors:** devices that are able to detect changes in an environment (ex: motion detectors).
- **Nanotechnology:** as the name suggests, these are extremely small devices with dimensions usually less than a hundred nanometers.
- **Smart networks:** (ex: mesh topology).

The most basic architecture is a three-layer

It was introduced in the early stages of research in this area. It has three layers, namely, the perception, network, and application layers.

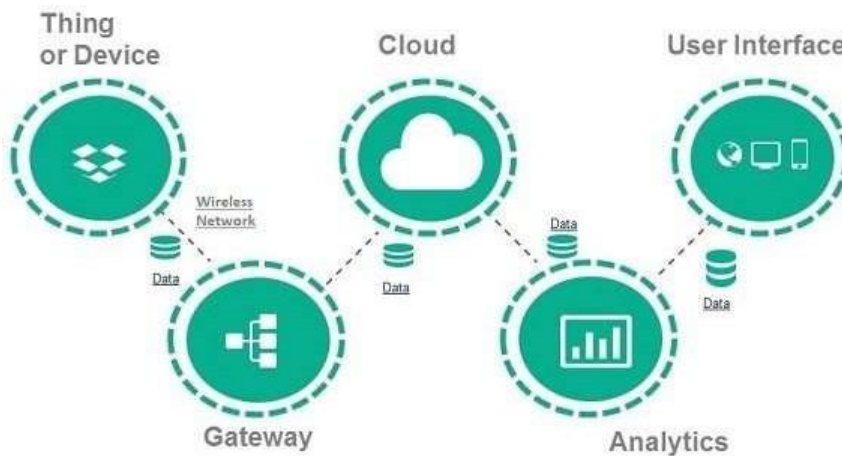
(i)The perception layer is the physical layer, which has sensors for sensing and gathering information about the environment. It senses some physical parameters or identifies other smart objects in the environment.

(ii) The network layer is responsible for connecting to other smart things, network devices, and servers. Its features are also used for transmitting and processing sensor data.

(iii) The application layer is responsible for delivering application specific services to the user. It defines various applications in which the Internet of Things can be deployed, for example, smart homes, smart cities, and smart health.

What are the major components of Internet of Things

Major Components of IoT



How the devices are connected?

Most of the modern smart devices and sensors can be connected to low power wireless networks like Wi-Fi, ZigBee, Bluetooth, Z-wave, LoRAWAN etc... Each of these wireless technologies has its own pros and cons in terms of power, data transfer rate and overall efficiency.

Developments in the low power, low cost wireless transmitting devices are promising in the area of IoT due to its long battery life and efficiency. Latest protocols like 6LoWPAN- IPv6 over Low Power Wireless Personal Area Networks have been adapted by many companies to implement energy efficient data transmission for IoT networks.

6LoWPAN uses reduced transmission time (typically short time pulses) and thus saves energy

THANK YOU